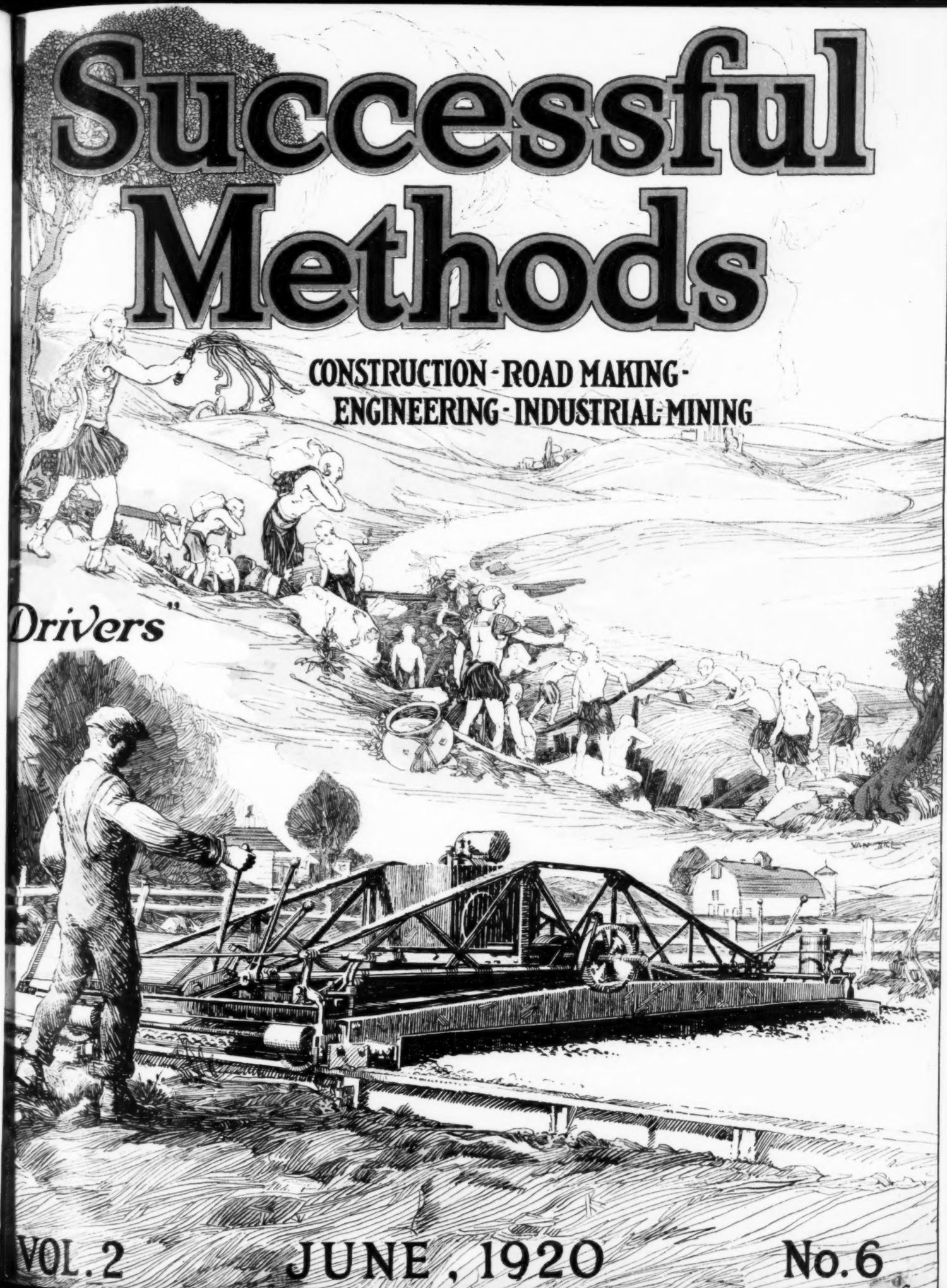
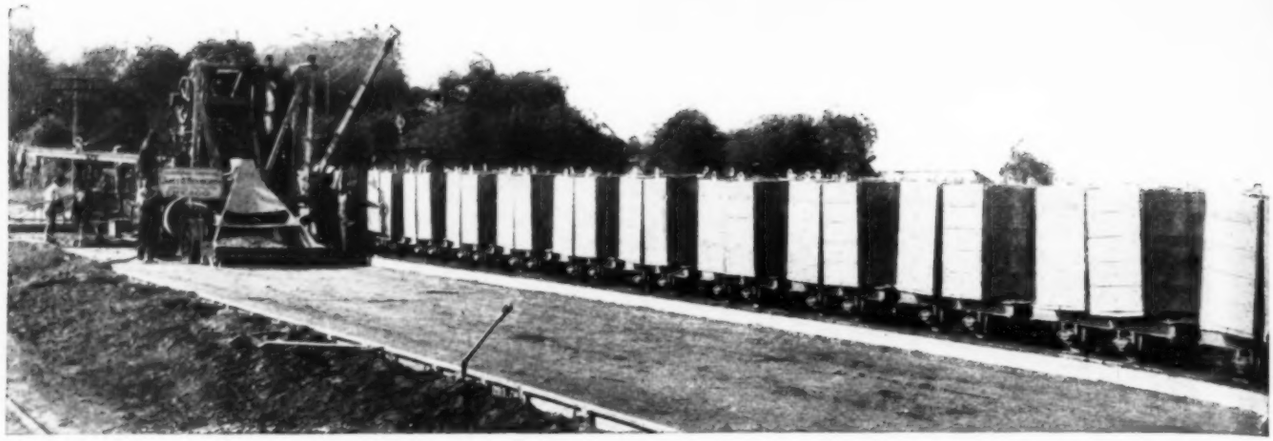
Successful Methods

CONSTRUCTION - ROAD MAKING -
ENGINEERING - INDUSTRIAL - MINING



VOL. 2 JUNE, 1920 No. 6



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Adjustable Batch-Boxes to Suit the Mixture

Western Batch-Boxes, when so ordered, are made with three compartments. By means of a sliding inside compartment for cement the outside compartments for sand and stone can be adjusted relatively to suit the mixture desired.

In all concrete road contracts to which it is adapted, the Western Batch-Box Direct-Charging System of handling the aggregates effects an enormous saving. One company, by installing 25 Western Batch-Boxes, increased their output two-thirds and cut out 20 men.

There is another saving. By keeping material off the grade, through the use of industrial railway, you will be able to back-fill inexpensively with loose dirt instead of filling up with extra concrete which costs money.

Consult our Highway Engineering Department freely as to the wisdom of installing the Direct-Charging System, or what methods to use in your work. We are as anxious to see you make money as you are to make it, and you can depend absolutely on the sincerity of the advice given. Our engineer recently showed one contractor how he could save $18,000 by NOT installing the Direct-Charging System.

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Successful Methods

A Magazine of Construction Service

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DRIVERS

To Be Driven
or
To Be the Driver

A foolish question? It would seem not, for down through the ages men and groups of men have wailed long and loudly when someone came along and offered them a chance to become drivers instead of being driven. One great labor-saving machine after another has been cried down by those who feared it would take away their jobs.

Yet, what are the real facts? Just these: the introduction of labor-saving machinery increases the production of men; it opens up new and unexpected fields of endeavor; it almost always tackles and does the dirty work.

Turn back and look at the cover. Which is the pleasanter half of the picture? The slaves building roads for Imperial Rome with the driver's whip of knotted thongs cracking about their ears, or the man driving the finishing machine with the rat-a-tat-tat of the tamper replacing the machine-gun fire of the Roman soldier's crackling whip?

The answer is easy when you look at it in that way.

This Magazine Will Be Sent to Men Who Can Use It.
This Issue Has a Circulation of More Than 75,000.

EDITORIALS

The High Cost of Not Building Roads

A MAN who had just returned from a trip through a section of Illinois, so close to Chicago that from a stranger the story would have sounded incredible, told of seeing farmers at cross roads pouring milk out on the ground because there was no way to get it to the city. They had brought it to the cross roads on the previous day and upon returning twenty-four hours later with another lot, found the first still untouched.

The reason? Bad roads, of course; roads in such wretched condition that the motor trucks which should have picked up the milk were unable to get through.

This isn't meant to libel the great state of Illinois. Similar scenes may be witnessed all over the land. Milk is poured away; carefully tended crops rot on the ground; and all because the way to the market is blocked.

No wonder prices are high. And they are not likely to come down until the means of communication are improved. The railroads have all they can do. They have more business than they can handle.

The roads promise the only relief in sight. They cost money to build—no one denies that—but it is more expensive not to build them.

When money is spent in the construction of a hard surfaced road, one that will resist the wear and tear of heavy traffic over a long period of years, the immediate cost may seem great, but it shrinks into insignificance when the money saved is computed.

Items such as milk and agricultural products have been mentioned. They are a big saving, of course, a saving that every man can understand the moment his attention is called to it. But there are other items, too. The amount of gasoline needed to drive a motor car over a good road is much less than that needed for the same mileage on a poor road.

The wear and tear on tires, on the entire machine in fact, are less on the good road. Then time is money. Every minute saved in getting any product to the place where it is most needed is a genuine saving.

There are hosts of others but they need not be mentioned here. Roads, good roads, cost real money, but they save more than they cost. It costs more not to build a road than it does to build one.

Build good roads now!

Keep the Cars Moving

THAT is what we said last month, but we repeat it now with all the emphasis our readers are willing to stand for. And you can't keep the cars moving if you take your time unloading them when they are turned over to you.

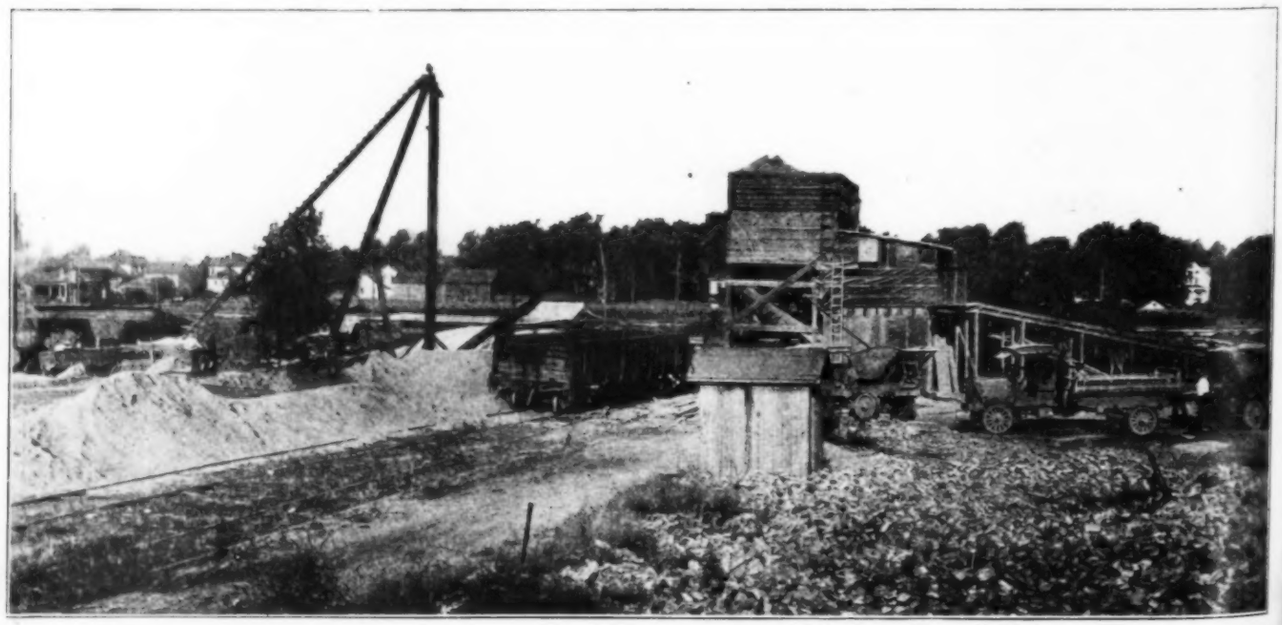
How often do you see a gang of men with hand shovels unloading a car? And how often is it really necessary to resort to that archaic method? The answer to the first question ought to equal the answer to the second, but it doesn't. It is a considerably bigger figure, so much bigger than it should be that it borders on a scandal in these days when freight cars are so scarce.

If you have cars to unload, find out the quickest and cheapest way to unload them. Get the equipment that will get the material out of them in the shortest space of time and you will save money.

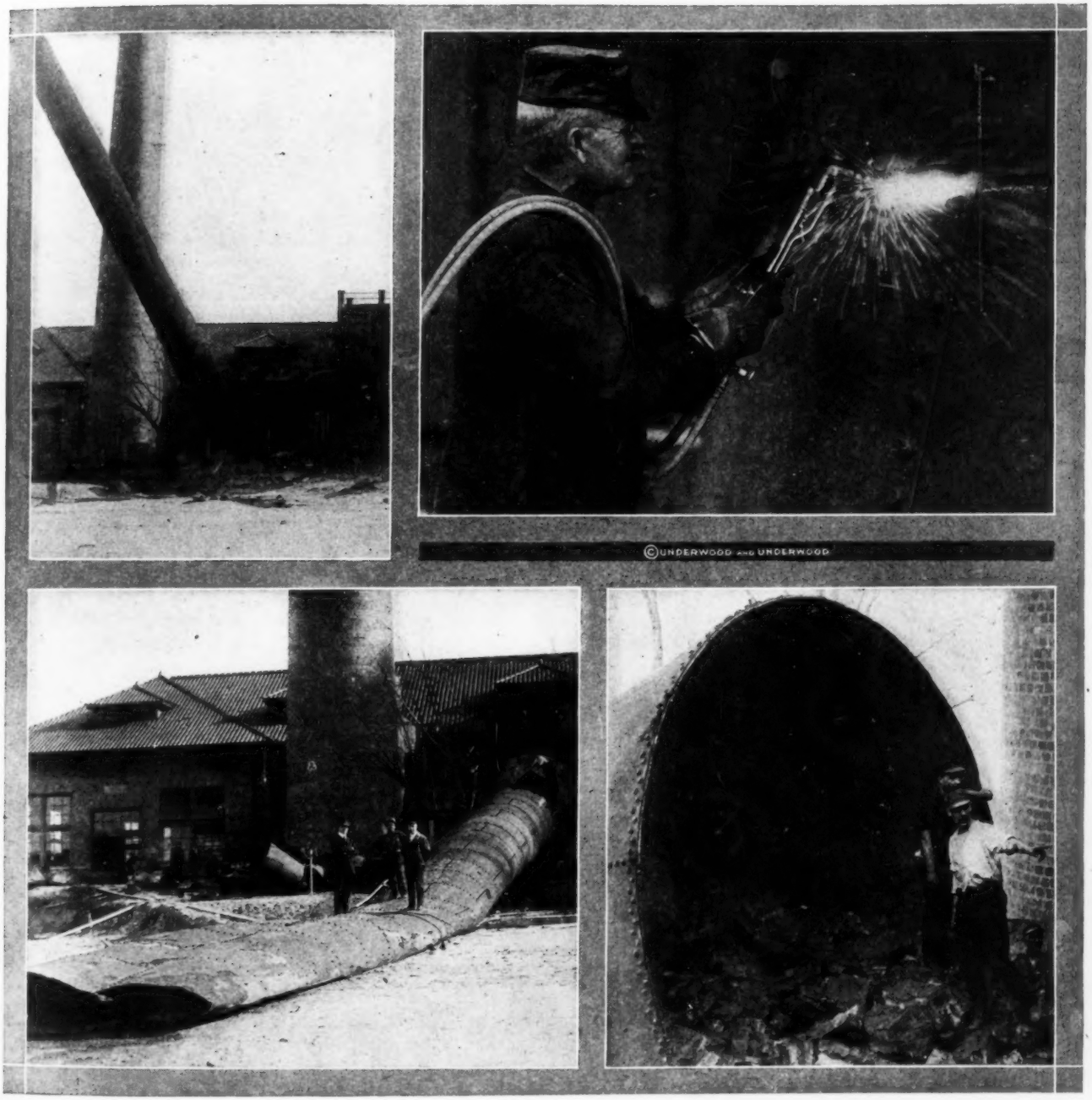
Where you are engaged on a big job, where you control the cars used, get cars that fit the job. Don't use flat and gondola cars where dump cars should be used. Release the flats and gondolas for other work. They are needed and you ought not to tie them up.

But above all, keep the wheels turning. A car standing still is only a bin and it is too costly a piece of equipment for that role.

A Central Mixing Plant on the Dixie Highway

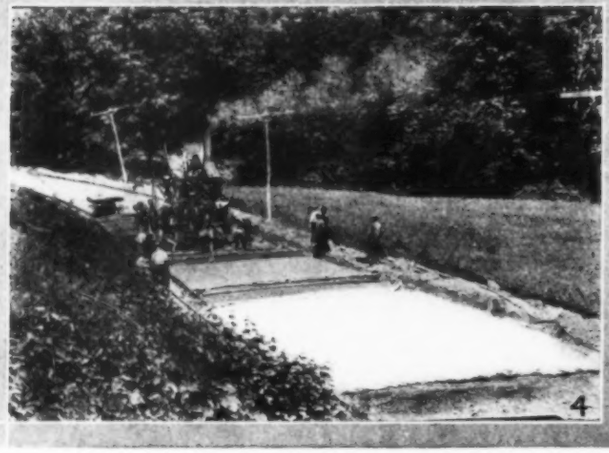


Cutting Down an Iron Stack



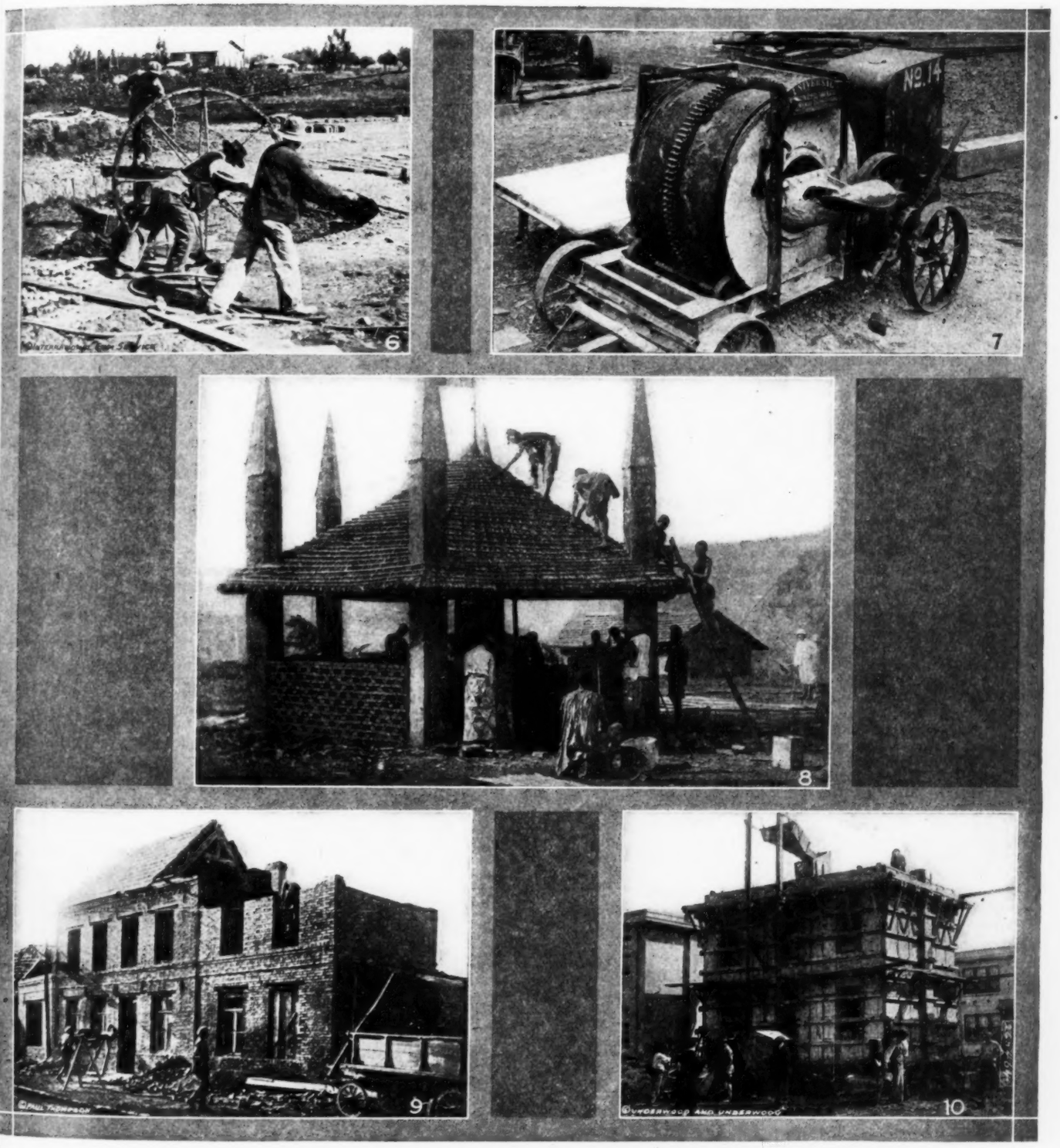
These four photographs show the efficiency of an oxy-acetelyne cutting apparatus. The iron stack of the pumping station at Winnetka, Ill., which was about 200 feet high and lined with brick, was replaced by a brick stack. A steeplejack removed most of the brick from the inside and attached a rope to the top. Then the oxy-acetelyne apparatus was used to cut off the stack at the base where it measured more than 15 feet in diameter. One pull was sufficient to bring it to the ground. The man handling the apparatus is the oldest acetelyne welder in Chicago and accomplished his task in two hours.

Old and New Methods



1—A crude road drag used in Australia. The man who sent it insists that it is as unusual in Australia as it would be in America, but adds that it proves the ingenuity of the Australian roadbuilders. 2—An up-to-date grader with planer attachment hauled by a small tractor in Oklahoma. 3—A pretty scene, but a road that would stand repairing. 4—Building a concrete road in Pennsylvania. 5—One of Cuba's finest roads near Havana.

On Construction Jobs



6—A primitive type of mixer used in restoring one of the old California missions. 7—A modern concrete mixer that can be used for all sorts of smaller construction jobs. 8—Building a house in the East Indies, no mixer or other machinery required. 9—Rebuilding France. A house made of old bricks collected in a ruined village. 10—Relieving the housing shortage in America by putting up small concrete houses.

ROAD MAKING AND MONEY MAKING

More Opinions from the Readers of Successful Methods on the Subject of Cooperation Between Contractors and State Highway Officials

Some Questions from Vermont

A QUESTION which goes straight to the point always is worth while. Here are a whole flock of them from C. J. Gilfillan, a contractor of St. Johnsbury, Vt. The questions are put to the state engineers who stated their views on cooperation with contractors in the March and April issues of SUCCESSFUL METHODS. Mr. Gilfillan believes that there is considerable to be said on the contractor's side and has the courage to say it. Here is his letter:

EDITOR, SUCCESSFUL METHODS,

Dear Sir:

I notice that the Engineers on the State Highways of the United States are agreed that from 15 per cent to 20 per cent is profit enough for a contractor. I am wondering if they had an investment of from $8,000 to $15,000 in the line of engineering plant that they could use only from six to seven months of each year, if they would be willing to take the salary per month that they are now getting and feel that they were getting a square deal for the year on that amount of money.

I notice that they all say that from 15 to 20 per cent is what a contractor should have for profit. If this includes his risk on the price of material, on the rise in price of labor and risk of damage from storm and the inclemency of the weather, we don't think it is enough.

We notice in some of the specifications that are drawn for earth work are included everything up to stone that is over sixteen cubic feet, anything over that should be paid for at a rock price. Now in most of the highway work in the eastern states there is more or less clearing and grubbing, and any contractor knows that it costs as much if not more to remove a tree that has from two to five cubic yards as it does a boulder of that size.

As regards the grubbing or removing sod from the right of way where the fill is not more than one foot, with the cuts and fills as light as they are on most highway work, it is pretty hard for a contractor to make an estimate that would be fair to himself as well as fair to the state from a blue print. Why not take care of this by specifying the way of bidding on this by measurement, the same as in railroad work.

In some tile drain work you see a specification reading that if suitable material is not found for back filling out of the excavation for the drain that gravel shall be furnished from some other source. Why not state how much of this gravel shall be used and how it shall be paid for? The contractor naturally thinks that this would be handled under the borrowed material clause, but we have known engineers to rule otherwise.

Some state engineers specify that the contractor shall furnish all stakes necessary for laying out the work and also furnish the engineer in charge with what extra help he needs from time to time to take care of the work. Now this is all right for the resetting of stakes that have been knocked down or broken by the contractor or his men, but why should he do this work in the first place?

In most of the specifications you will see this clause that if the inspector or engineer in charge orders any change in the work different from what the contract calls for it shall be done in writing. I have been in the contracting game for twenty years and I have never been able to get it done yet. Why?

Now you ask the average engineer what he thinks about the percentage plan and he looks at you and smiles and acts just as though he did not think you were quite in earnest and that the contractor is trying to put something over on him.

Is it not fair to suppose that there are as many honest contractors as there are honest engineers or honest business men in other kinds of business? Does he not think that the contractor thinks as much of his reputation as other business men or engineers think of theirs?

We would suggest that a competent inspector be put in charge, that he say whether the work was done according to the contract and that his word be what the contractor should abide by in doing the work.

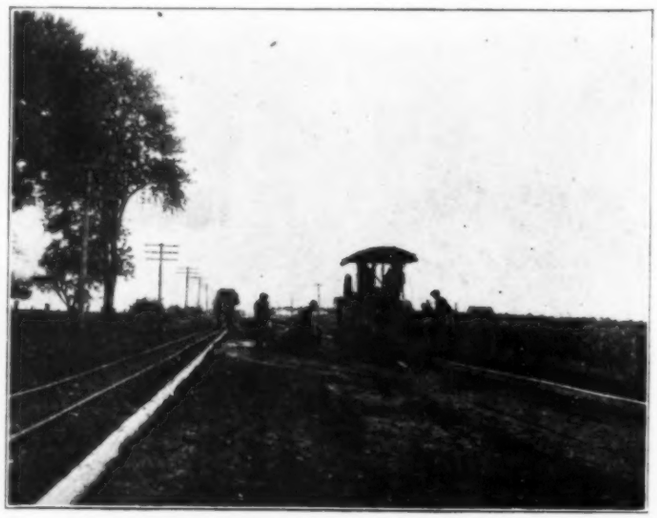
Good inspectors are scarce and the system of sending a lot of students out on a job as inspectors is wrong and the state and the contractors have to stand the cost of their inexperience. Would a contractor take one of these inexperienced boys and put him in charge of a large contract? He would not. Neither can the state afford to do it.

Get your specifications down in good English, plain every day English. Try to have them cover and explain everything in the contract. Don't leave anything for the contractor to guess at. If the gravel is furnished by the state and has to be stripped have a price for doing this stripping by the yard. Don't ask the contractor to guess how much you are going to make him take off for nothing. This work should be paid for in a class by itself.

Now engineers as a class are honest square men and are trying to do right and this same rule also applies to contractors as well as to other business men. And as a class I think that the contractor will go as far as he can to meet the engineer half way.

We are not criticizing the engineers. Some of the best friends I have in the world are engineers. We are just trying to show the readers of this magazine the contractor's point of view on the subject of co-operation with the engineer on highway contracting or any other contracting.

C. J. GILFILLAN.



PREPARING THE SUBGRADE

A Problem for Kansas to Solve

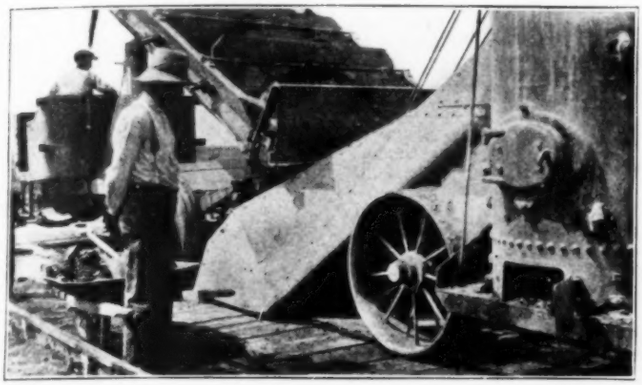
AN interesting phase of the labor situation in Kansas is brought up in the following letter from Allan W. Bird, of the Western Bridge Company, Harrisonville, Mo. A law which no doubt worked excellently when there was plenty of labor to be had seems to be working against the interests of nearly everyone now that labor is scarce. It is a puzzling question which Mr. Bird presents. He says:

Editor, Successful Methods,

Dear Sir:

In looking over your magazine, our attention was directed to a letter from Mr. M. W. Watson, State Highway Engineer, in which he states that "this department has always tried to co-operate with the contractors to the fullest extent." This spirit is a very good one indeed and as we are extensive operators in the bridge building line in Kansas as well as other states, Kansas particularly, we wish to advise that the load is considerably lightened by the amendment to the law allowing the payment for materials, as it used to be 50 per cent of materials furnished and of such labor done.

Now getting to another point, we would like to have their attention called to another matter. We have been wondering how we could call their attention to the labor proposition which in our minds is a very important subject to the contractor at present. The State of Kansas has a very strict 8-hour law which applies only to public works and nothing else. This only allows the contractor to work 8 hours per day and, therefore, curtails the production in his line 20 per cent, while private concerns can work as long as they desire, thus making it very hard for us to get help in this way. We attempt to hire men. They are asking 50 cents per hour. They immediately ask us how



FROM TRUCK WITH BATCH COMPARTMENTS TO MIXER SKIP ON A ROAD JOB IN ILLINOIS

many hours we are working. We tell them 8 hours. They reply that they can make more money for another party as he is working 10 hours or as long as they care to work.

Then during harvest we have no show whatever inasmuch as we cannot compete with the harvest for same reason. Should the estimates on public work be unlimited we could figure $5.00 for 8 hours, but then there would be a protest.

Could not there be some way whereby we could get an amendment to this law allowing these workmen to elect the number of hours they desire to work? Then should they only want to work 8 hours it could be made unlawful for them to be discharged, but should they wish to work longer, as 90 per cent of them do, let them work the 10 hours. This would make matters much easier for us in the labor line, as this would allow us to increase our output or rather to get our work completed sooner and get more work done per firm each year.

Owing to the shortage of men and the fact these same men can work longer hours for some private concern it looks unfair to the contractor of public works. How does it seem to you?

Yours very truly,
WESTERN BRIDGE COMPANY,
ALLAN W. BIRD.

Praise from Utah

IN general the state highway officials in Utah give the contractor a square deal, according to D. H. Christensen of the Christensen Construction Company of Salt Lake City. Like every other contractor, however, Mr. Christensen occasionally encounters an immature field engineer or inspector of the "Know-it-all" type, and on such occasions he isn't quite so well pleased. He says:

EDITOR, SUCCESSFUL METHODS,

Dear Sir:

Our relations with state engineers and with chief engineers on government projects have been very agreeable. We have found them to be high class men who are anxious not only to get good results for the state and government, but who are also anxious to see the contractor keep above board.

Occasionally we have found a subordinate in the capacity of a field engineer, who in his extreme anxiety to please his chief, had failed to understand the project in all of its bearings, and who, in consequence, has become negative rather than positive in his attitude towards the work. These cases are rare, but when they do arise they are not only annoying, but also expensive to the contractor.

Very truly,
CHRISTENSEN CONSTRUCTION COMPANY,
D. H. CHRISTENSEN.

Real Cooperation in Wyoming

PERHAPS the fact that D. S. McCalman, State Highway Superintendent of Wyoming, used to be a contractor himself, has something to do with his untiring efforts to make cooperation with contractors something more than a mouth-filling phrase in that state. Here is a letter which he sent out recently to all county commissioners in Wyoming. There isn't much doubt where Mr. McCalman stands on this important subject.

STATE OF WYOMING
HIGHWAY DEPARTMENT
CHEYENNE, WYO.

Dear Sir:

Our State Highway program is so extensive this year, that in order to carry it out, we who live in the State will have to prevail upon men capable of doing the work to enter the contracting game and after we have got men in the contracting game, it will be no more than proper to help them in every way we consistently can to finish the work they undertake.

With this thought in mind, I respectfully request that you take a personal interest in this matter and try to prevail on contractors or "would be contractors" to bid on our work. Even though they are not successful in their bidding, the mere fact that they file a bid on a job will tend to reduce the bids of other contractors in competition and the State will thus be benefited by their action in the matter.

I appreciate, of course, that we can not expect contractors to go to the expense of examining work and filing bids for our benefit entirely, but I am especially anxious to promote competition in bidding for all our contracts and the thought that they will be benefiting the State may have weight with some of our good citizens.

Also, I would earnestly request that when work has been awarded a contractor, the citizens of Wyoming living along the highway on which he is working co-operate with him in every way possible and show him they are in sympathy with his work and in the mood to help him out rather than hinder him in the carrying out of his contract with the State.

By such action the residents of each County will make it

WYOMING ROAD AS IT WAS BEFORE THE STATE HIGHWAY DEPARTMENT GOT AFTER IT

more certain that proper bids will be received for road work in their neighborhood and after contract for work has been awarded their highway will be completed in a shorter time, thus inconveniencing the people who travel the road for a shorter time and getting a return for our investment in the road at earliest possible moment.

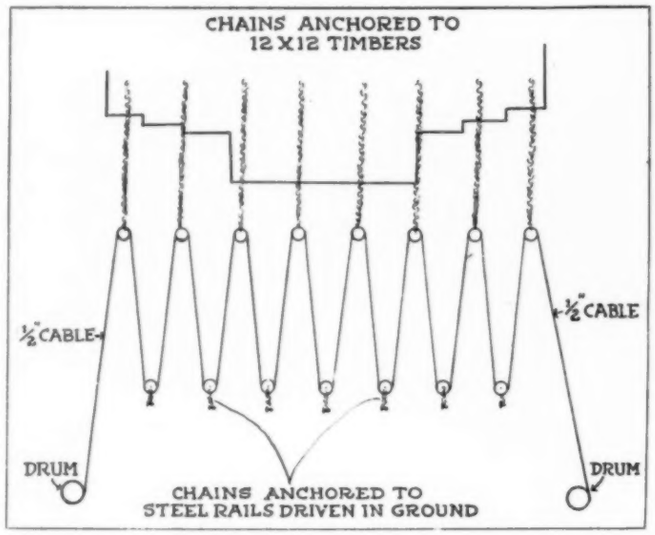
If you can suggest anything the State Highway Department might do to help create good feeling between our citizens and the contractors to whom we are awarding work, the writer will appreciate hearing from you.

Yours very truly,
D. S. MCCALMAN,
Superintendent.

MOVING A MARBLE BANDSTAND

By George T. Donoghue
Chief Civil Engineer, Commissioners of Lincoln Park, Chicago, Illinois

MOVING a 300-ton chunk of masonry 300 ft. is not a bit easier than it sounds. Nevertheless, it has just been accomplished in Lincoln Park, Chicago, where a marble bandstand was removed from the position it had occupied for nearly six years and transported to a new home. A much traveled parkway had to be crossed and the bandstand had to be turned half way around. In its old location it faced the West and at afternoon concerts the musicians had to stare at the sun as well as at the conductor while the eyes of the audience caught frequent blinding flashes from the brass instruments. Now the bandstand is snugly ensconced in a shaded spot and faces South.

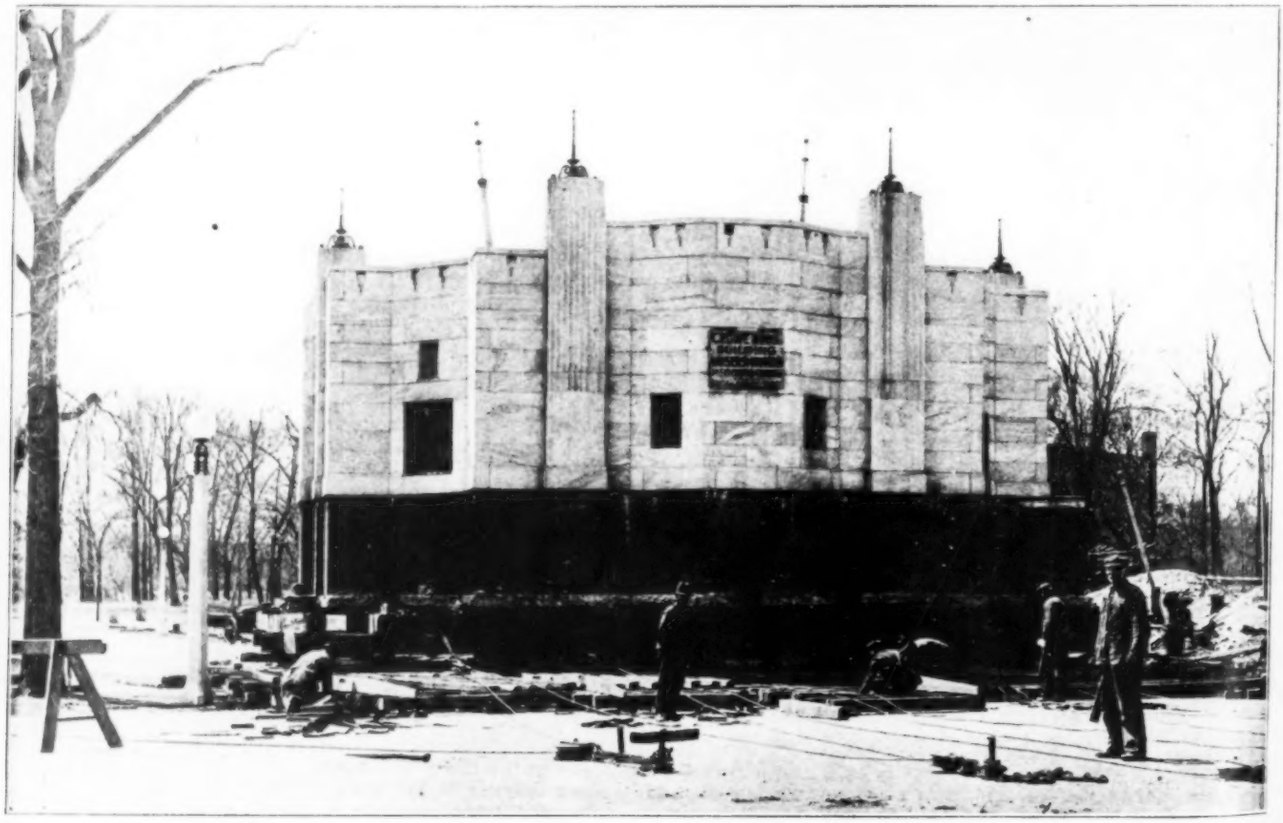


HOW THE JOB WAS DONE

So much for the reasons why it was moved. The real purpose of this article, however, is to tell how the moving was done. But before that is told a few words of description are in order. As may be seen from the photographs, the bandstand consists of a superstructure and foundation. The superstructure is composed of a marble facing over a brick interior with a tiled floor. The two groups of figures at the ends are carved of stone. The foundation is of concrete reinforced with steel, is 6 ft. high and contains about 85 cu. yd. In this foundation are some unusually thick walls, one section under the leader's pedestal being 5 ft. 2 in. in thickness. The stand is 27 ft. 9 in. by 21 ft. along the two center lines. The weight as said above is about 300 tons.

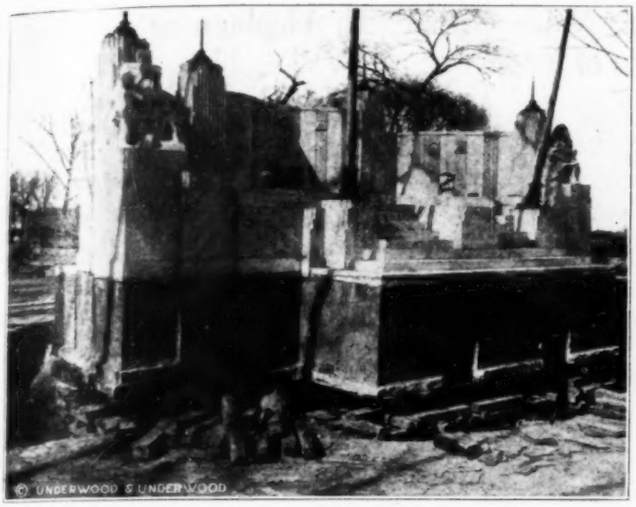
The method of moving was unusual as both superstructure and foundation were moved as a unit. When this plan was proposed there was some objection on the ground that checking or cracking of the marble might occur, but the judgment of those in charge was vindicated when the job was completed and little, if any, checking or cracking found.

The first step was to uncover the foundation which was done by excavating entirely around it. The 4 in. concrete basement floor was taken out as were several thin partition walls in the basement. Screw jacks then



THE BANDSTAND CROSSING THE DRIVE ON THE WAY TO ITS NEW HOME

were used to raise the entire structure to a height of 9 ft. above its original position. Level marks were cut on



LOWERING TO NEW SUBFOUNDATION

all four sides of the foundation and at convenient corners to aid in keeping the structure level while being raised. Cribwork was inserted under the stand when the raising was finished and the next step was the moving to the new site.

The diagram which appears as part of this article shows the arrangement of the pulleys during the moving. Two teams of horses were attached to the drums. One of the most interesting features of the moving was the full 90° turn which had to be made.

At the new site a 12-in. slab of concrete was ready to receive the stand. It was reinforced with ½-in. twisted steel rods spaced 12 in. from center to center in both directions. This subfoundation was built by the Commissioners of Lincoln Park under the direction of the chief civil engineer. The stand was run on this subfoundation and then lowered into place. When it was as low as the jacks would take it an underpinning of paving brick was started underneath the foundation walls. This work is now in progress. About 2,000 brick will be laid in the underpinning.

Crowe Bros., house movers of Chicago, did the actual moving which took several weeks. The work was done

DETAIL OF CRIB WORK

under the supervision of John C. Cannon, Superintendent and Secretary of the Lincoln Park Commission, and George T. Donoghue, Chief Civil Engineer. George Trinkaus acted as Assistant Engineer on this work.

The stand which cost about $20,000 in 1914 is the gift of an anonymous donor. Pond and Pond were the architects and Lorado Taft the sculptor.

The new setting will be some what higher and more monumental than the old. After the necessary grading and planting has been completed, concerts will be resumed.

BIG ENGINEERING FIRMS MERGED

TWO of the largest engineering and construction organizations in the country are now combined and working as a unit. The Westinghouse, Church, Kerr & Co., Inc., has been merged with the Dwight P. Robinson & Co., Inc., under the name of the Dwight P. Robinson & Co., Inc. The executive offices of the new company will be at 61 Broadway, New York City, and the engineering and designing offices at 125 East 46th St., New York City. Dwight P. Robinson, for many years president of the Stone & Webster corporation, is the head of the new company. Both companies have long and enviable records of big construction jobs, the Westinghouse, Church, Kerr & Co. being one of the oldest organizations of its kind in the country and having been formed 36 years ago.

In a recent letter to SUCCESSFUL METHODS Henry H. Kerr, vice-president of Westinghouse, Church, Kerr & Co., pointed out that his company was a firm believer in the cost-plus-a-fee method of doing work, having used that system for more than 20 years and having completed more than $100,000,000 worth of work under it.

WANT ILLINOIS TO BUILD ROADS

THAT the road using citizens of Illinois are not entirely content with the decision of the State to call a halt in road building because of the high prices, is indicated by a petition received recently at the office of SUCCESSFUL METHODS. This petition was prepared by citizens of Stephenson, Winnebago, Boone, Kane and McHenry counties which border on Route 5, designated as the Grant Highway. It recites that the citizens of these counties have loyally supported the Illinois $60,000,000 road bond issue, points out that the Grant Highway is one of the most important military and commercial overland routes in the country, states that the present high prices of labor and material are not likely to be reduced in the next five or ten years, and requests that the state proceed with the road building plans which were made originally.

Those who prepared the petition expect to present it to Governor Frank O. Lowden as soon as a sufficient number of signatures have been obtained. It also will be presented to the state highway officials in the hope that they will alter their present attitude and push the road building program.

A STATE AS A ROADBUILDER

Pennsylvania's New Bureau of Construction, With Donald M. Hepburn as Chief, May Get Acquainted With Some of the Contractor's Troubles

THOSE who are continually worrying because of the lack of uniformity in the laws of the various states of the United States might do well to consider for a moment one of the great advantages of that very lack of uniformity. Just because one state does something in a certain way, the other forty-seven are not obliged to follow suit. They can watch the experiment from afar and then, if it proves its worth, adopt it. If on the other hand it does not work well, the only sufferer is the state which has tried it out. The reservation to the states of the power to regulate their own affairs is much more useful than it often seems.

The great nation-wide road building movement in which so many millions of dollars are spent annually is one of the direct beneficiaries of this freedom of one state to experiment without involving the others. All through the country the business of building roads under governmental supervision is being developed by keen-minded men whose plans for the improvement of their great business can be tried out in their own communities without the necessity of going through the rightly difficult process of changing the methods in use all over the land.

In the May issue of SUCCESSFUL METHODS the new form of contract which the State Highway Department of Georgia is trying out was described. If it works well and the contractors like it, other states probably will follow Georgia's lead. It was for the purpose of putting it before the contractors and readers of the other states that SUCCESSFUL METHODS published the article by W. R. Neel, the State Highway Engineer of Georgia.

This month is Pennsylvania's turn. The Keystone State has decided to experiment this season by building important stretches of State highways with its own construction crews. The State also will have its own construction equipment and will open its own quarries and sand banks.

The entry of the State into actual roadbuilding was the result of a series of conferences held by Governor Sproul and Lewis S. Sadler, State Highway Commissioner. The legislature then enacted new laws permitting the State to build highways as well as to maintain them. Those responsible for the new plan point out, that even with the State in the road building business, no contractor who desires to work in Pennsylvania need worry about any lack of roads to build. The State's program is so large that the greatest difficulty is in finding enough contractors to take care of the work.

Believing in the theory that if a thing is worth doing at all it is worth doing well, Commissioner Sadler and Col. W. D. Uhler, Chief Engineer, organized a new branch of the State Highway Department to be known as the Bureau of Construction. A further and equally important step in the process of getting the job done well was the selection of Donald M. Hepburn as chief of the new bureau.

DONALD M. HEPBURN

At the time of his appointment to his new post, Mr. Hepburn had just been made chief of Philadelphia's Bureau of Street Cleaning and the City was so loath to let him go that a compromise was reached, and after reporting at Harrisburg, Mr. Hepburn was permitted to go back to Philadelphia for a few weeks in order to finish the work of reorganizing the street cleaning bureau.

All of which indicates that Mr. Hepburn is a pretty valuable sort of man. The reasons why may be discovered by a brief review of his engineering career. Born in Carlisle, Pennsylvania, a little less than 40 years ago, Donald M. Hepburn began his business career when about 18 years of age, his father, a leading member of the Cumberland County Bar having died some years before. Construction work, especially big jobs involving the handling of large numbers of men, is his forte. He has developed a sort of genius for such work and combines with it an unbelievably wide acquaintance with men in the construction field. He has accomplished some tasks which at their inception seemed all but impossible.

Take his work as superintendent of construction at Hog Island as an example. When he took charge only 300 carpenters were at work. After a quick survey of the situation he asked the employment department for 1,000 more carpenters within three days, and an additional 1,000 within a week. Not content with asking the employment department to furnish the men he got busy

himself and began sending a flood of telegrams all over the country asking for men. And he knew where to send the telegrams; that is where his long experience and wide acquaintance proved their worth. In less than 30 days he obtained 7,000 carpenters which is just about a world's record in that particular field of endeavor.

Before going to Hog Island, Mr. Hepburn handled a big construction job for the Firestone Tire & Rubber Company in Akron, Ohio, and made a remarkable record, completing the work in 83 days when the time limit was 120 days. He also built a big chemical plant at Niagara Falls and in the course of his long career successfully completed a host of smaller jobs in various sections of the country.

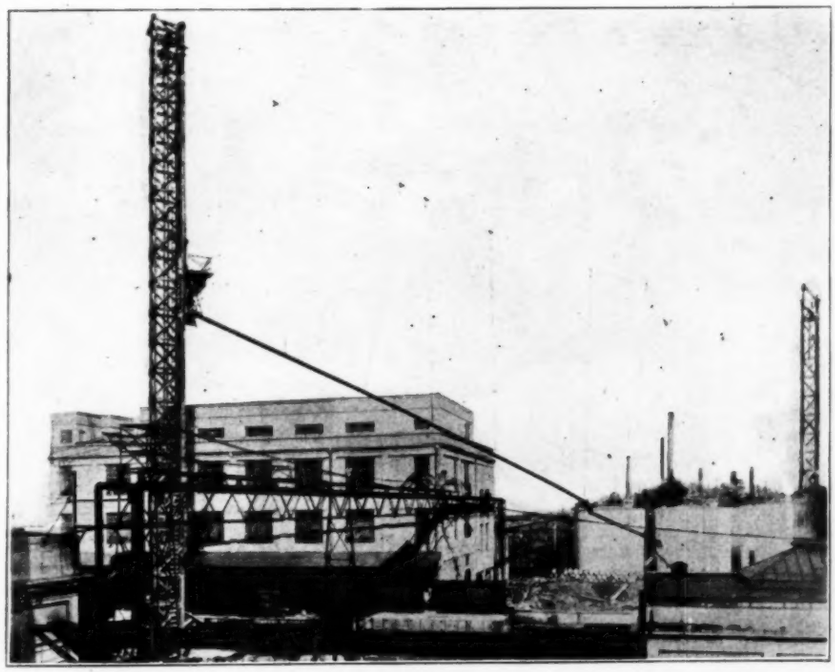
But the big jobs mentioned show the calibre of the man. With him at its head, the Bureau of Construction of the Pennsylvania Highway Department has a great opportunity to demonstrate the wisdom of those who created it. The work will be watched with interest by contractors and engineers all over the country and as one contractor put it, when told of the plan: "It will give the state a chance to see what the contractor is up against, and if it does that I'm satisfied even if the new department does grab a piece of road that I'd like to build myself."

BUSINESS AS USUAL

Building Put Up Over Continuously Operating Conveyor—Railroad Tracks and Steam Line Add to Difficulties of Construction Work

By R. C. Cornelisen

THE Texas Company desired to erect a 4-story building 90x133 feet between two buildings already in use and the problem was complicated by the fact that a barrel conveyor between the two structures had to be kept in operation while the construction of the new building was carried on.



CHUTING THE CONCRETE OVER STEAM LINE AND RAILROAD TRACKS. BARREL CONVEYOR MAY BE SEEN IN BACKGROUND.

The problem was complicated further by three railroad tracks alongside the buildings. These tracks were in continuous use. A steam line 30 feet in the air, together with electric cables, added their share to the problem of chuting the concrete.

These difficulties were overcome by erecting a 140-foot tower on the side of the railroad tracks farthest from the buildings. A second tower 70 feet high was erected on the roof of one of the older buildings, which is 35 feet high. This tower was used to support the cable for a continuous line chute. Concrete was carried across and above the obstructions by continuous line chutes to approximately the center of the new building. At this point 30-foot sections of chute with elbow connections were attached. This permitted pouring concrete for any part of the foundation or building without the use of carts or auxiliary chutes.

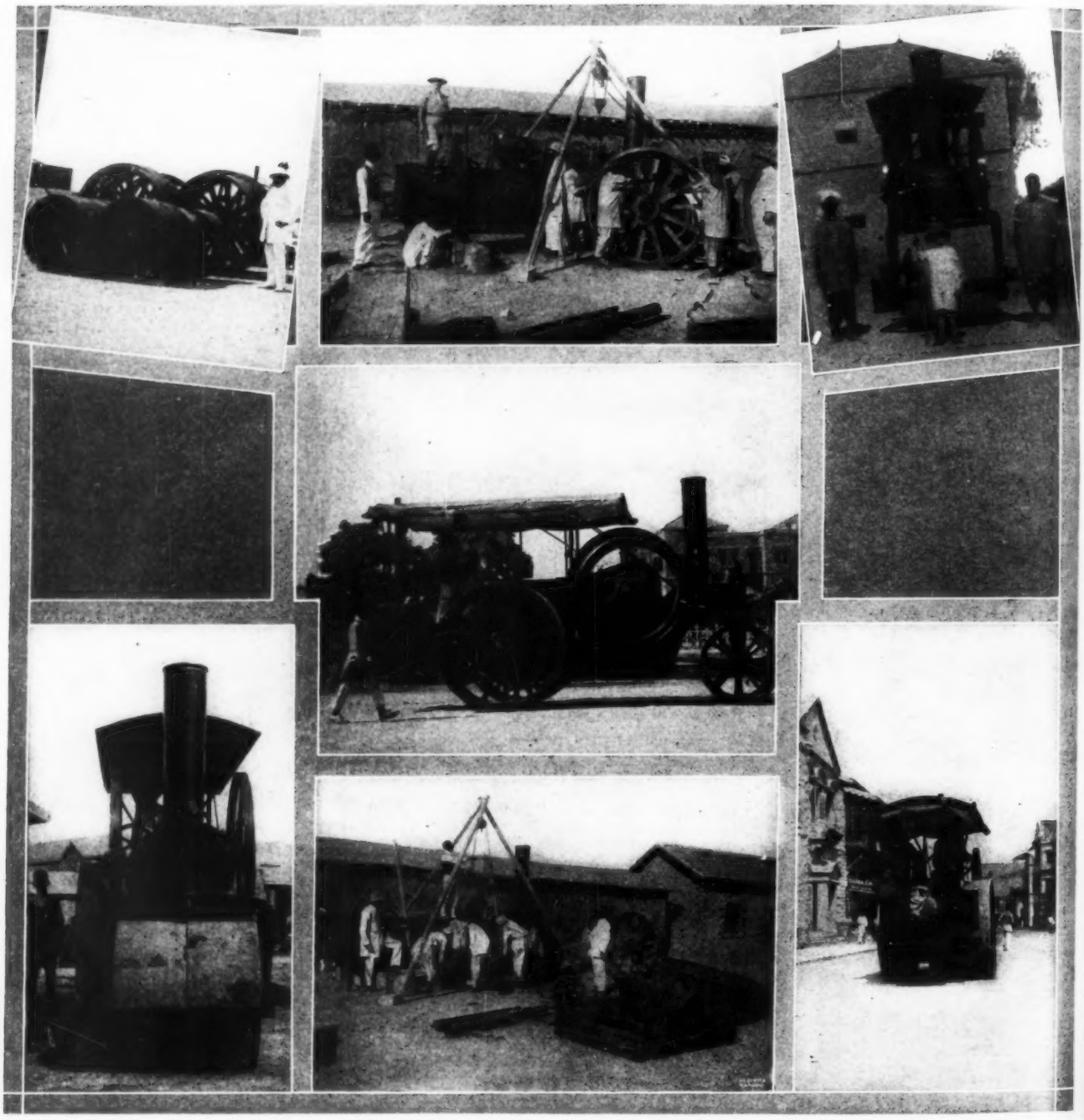
The barrel conveyors were run between the columns of the new building and operated continuously. The chute was carried high enough to clear the electric cables and the steam line. All obstacles were thus overcome and the concrete was placed without rehandling.

The cost of placing 505 cubic yards of concrete in the foundation was about 65 cents a cubic yard. On one occasion 75 yards of concrete were placed at a cost of 44 cents per cubic yard. The structure contains 1,500 cubic yards of concrete.

Part of the time the man who operated the discharge chute also performed the engineer's duties. Three men usually were needed on the floor of the building to operate the chutes when pouring concrete. Three men operated the mixing plant: a batch hopper operator, a discharge operator and an engineer.

Materials were brought in on cars. Stone was loaded into a 30-yard bin and sand into a 15-yard bin by means of a locomotive crane and clam shell bucket. The plant used included a ½-yd. mixer with batch hopper and water tank, a 14-ft. elevator bucket, a 21-ft. tower hopper and seven 30-ft. sections of chute.

The American Roller Arrives



These photographs show various stages in the process of assembling an American Road Roller purchased by the city of Karachi, India. In the photograph in the upper left hand corner the unassembled rollers are shown awaiting the arrival of the customs officer. In the top and bottom photographs in the center the workmen are assembling the roller in Karachi's municipal workshop and in the other views the roller is ready for desert roadwork. Its principal job was near Mullier and some of these photographs were taken while it was en route to this place.

ROAD ROLLERS IN INDIA

American Machines Work Well When Using Kerosene Fuel

By L. R. Vinall-Moon

A LARGE demand has sprung up in India for road rollers of the internal combustion type, on account of the scarcity and high price of coal. The size most suitable is the 10-ton roller, although a few 12-ton and possibly a few 15-ton rollers will be used.

Tests have shown that the lower grades of kerosene oil are far more satisfactory for actual work than the higher grades both on account of the lower price and also because they are always obtainable in any small Indian village bazaar. The high grade kerosene which is found only in the larger towns costs about 30 cents a gallon and the cheaper brands, which may be purchased nearly everywhere, range in price from 20 to 25 cents a gallon.

The tests also have proved that American motor road rollers will work on one-third crude and two-thirds kerosene oils and that in India, where the early mornings in the desert during November to March, inclusive, are very cold, the engine could in nearly every case be started by turning the flywheel backward twice, then setting starter and starting flywheel forward.

The obtaining of suitable operators for road rollers has been a problem, but at present a number are under training for employment by the Public Works Departments at both Bombay and Karachi. This training has proved a success and it has been found that members of the Mahommedan caste develop into better operators than men of the Hindu caste. The Public Works Departments are at present paying about $40 per month for drivers and $20 for cleaners or helpers.—Other users of American rollers in India are the Government of India, Punjab Works Department, P. W. D. Lahore, and the Chief Government Engineer of Delhi.

CONVEYORS LOAD MOVABLE BINS

Jersey Contractors Save Labor With Unusual Equipment

By D. B. Frisbie

AN unusual method of supplying the mixer has been used sucessfully by Stillman, Delehanty & Ferris of Newark, N. J., on a state road which crosses the Hackensack Meadows between Jersey City and Newark. The main material supplies were 5 miles from the point where the road was being made and were transported to the mixer in big delivery trucks with dump bodies.

A big wooden bin was built divided into two compartments for sand and crushed rock and mounted on wheels. Both bins were discharged through a single spout, which was so constructed that it assisted in the measuring. Each of these bins was fed by a portable conveyor 39 ft. long equipped with a flange attached to the hopper. The truck load of sand or crushed rock was backed close to the hopper of the conveyor leading to the appropriate bin and the body of the truck raised so that the material would dump directly into the hopper. It required only 4 men to dump a 5-ton load.

The bin holds a reserve supply of material sufficient to run the mixer for about half an hour and the contractor figures that by using the equipment 16 men can lay 120 ft. of road where before 23 men were required to lay 90 ft.

For moving the conveyors and the bin a heavy road roller is used and if necessary the trucks could be employed for this purpose. Three lines of cable extend from the bin and one from each of the conveyors to a common point where they are spliced together. This is made fast to the roller and the roller pulls all three of them the proper distance whenever the mixer advances. The average move is about 15 ft. The bin is mounted on 24 by 12 in. wheels. The photographs below show this equipment in use.

THE PHOTOGRAPH ON THE LEFT SHOWS THE TRUCKS DUMPING THEIR LOADS INTO THE HOPPERS OF THE CONVEYORS. IN THE CENTER IS A "CLOSE-UP" OF THE ENLARGED HOPPERS. AT THE RIGHT IS A PHOTOGRAPH TAKEN FROM THE OTHER SIDE SHOWING THE MIXER BEING CHARGED DIRECTLY FROM THE BINS

TIME STUDIES FOR A POWER SHOVEL

By Daniel J. Hauer, C. E.
Construction Economist

"SPEED up that machine, bawled a contractor, "I have to get more work done."

This may have been an excellent command, but it was somewhat ambiguous, for it was not clear whether the contractor wanted better and quicker service rendered to the machine or simply to make the mechanism go at a greater rate of speed. Now it is self-evident that if the rate of speed is increased without improving the service to a machine that the output is not increased, nor is it made the maximum unless the service and speed are both 100 per cent efficient.

It is the desire and aim to obtain this maximum output for the minimum cost, but it can seldom be accomplished, except by close study of all conditions, coupled with careful planning. This close study of machines means that both time and motion studies must be made of the machine operation and service.

Motion studies of most machines mean little, for the motions may be fixed as in the case of a steam shovel. The dipper and arm go down and up, the arm in and out, while the boom swings from one side to the other and back, and all the study of motions in the world will not change it. Some of the smaller machines and tools that can be controlled or operated by hand can be made to vary in their motions and thus a study of them is valuable.

The motion study of serving every machine means much and will bring good results. Time studies of both machines and men can always be made and are valuable, but time studies made of useless motions are only useful in order to discover how to eliminate them. Thus motion studies are first necessary to know that the right motions are being used; then time studies are needed to speed up both the motions and the service to the machine.

It is by such studies that both time and money are saved and the number of men employed kept at the minimum. It is a crime against capital and labor both for two men to do the work that one man can do, as well as for a man to do the work that a machine can do cheaper and better.

One great benefit that machines obtain for a job is that they set the pace for the men. Some years ago the writer was selling a machine for construction work and he used a slogan about the machine, which assisted in selling, namely, "It sets the pace for the job."

In keeping up to this pace it must be known, as must also the details of the service, to obtain the rated capacity. Thus a steam shovel that can excavate 100 cubic yards an hour and does only 25 can hardly be called efficient, yet it may not be the fault of either the shovel or its operator, but of the contractor, who furnished

insufficient teams or trains. Then in other cases it may be that the shovel is served properly, but the operator is not getting the proper speed from the shovel.

Time studies may be made showing just where the trouble is. The cost of such studies need not be more than a few dollars per day, and the studies may be completed in a week or less, giving a basis for working the job throughout if the proper cost and time system is installed. The ordinary speed for the dipper of a shovel, according to its size and type, is from two to four dipper loads per minute. This is the rated speed and the service and operation should be so conducted as to obtain nearly this speed during most of the day.

The essentials for making time studies of a shovel are a hand-counting machine, a stop watch and some properly ruled forms. Such forms are shown in Figs. 1 and 2. These forms can be fastened to a handboard by means of thumb tacks and some blank pieces of paper for use in keeping tab on various features can be fastened in a bunch by a string and attached to the board. In the form illustrated in Fig. 1, a record is kept that shows the speed of the shovel when actually operating, while that in Fig. 2 is a record covering the operation and service to the shovel. In these two records every detail of the shovel's work is set down and it is possible after the day's work is finished to analyze the record so as to see if the operation of the shovel can be improved and also the service.

Thus the first record covers the entire time of actual operation, showing the number of dipper loads the shovel made, the average per minute, the number of wagon loads, the average time for loading and the average number of dippers to the load. These figures will show if the rated capacity both for speed and dipper loads is approached, and if not, some reason for it may be obtained either from this record or that shown in Fig. 2. Here the entire time of the shovel operation for a day is listed, showing the time consumed in actual operation, in moving the shovel, in making necessary repairs, in waits for blasting and other delays.

It is not possible in the limited space available to give a day's record upon the forms, but enough is given to show how Form No. 1 can be used to show the time of the shovel operation and also the detail study of moving the shovel and the results of such records, while on Form No. 2 is shown the record for 1 hour and 43 minutes' work.

Comment upon these records will show a great number of things that could be done to increase the amount of work without increasing the cost, thus reducing the uit cost of excavation.

First of all, it will be noticed that the shovel did not start on time, five minutes being lost due to oiling the machinery. It is always a difficult matter to start a job on time, especially where machinery is used. If the machine is ready the wagons may be late, or if these are on time there may be a delay due to blasting or for other reasons. In this case the shovel runner lost time in doing work that he could have done before 7 o'clock. The cost for teams and labor on or around this shovel was more than 75 cents per minute, so that five minutes' delay meant a loss of more than $3.75. To pay an engineer for half an hour extra time morning and evening would have been cheap as compared to this delay.

It will be noticed that when the shovel started it worked 11 minutes. First 2 minutes and 10 seconds; then with a slight delay due to the fourth wagon adjusting some harness (this should have been done at the stable before the team started, the blame being upon the driver and stable boss) 8¾ minutes, but that the cut at this point was nominal, as it took 3.33 dipper loads to fill a wagon in the first case and 2 dipper loads the second, that the time to load a wagon was nearly a minute, while in other cases two wagons were loaded in a minute.

When the shovel stopped the night before, it made a move, then excavated more than half the available dirt, and stopped. If the operator had worked his shovel for five minutes or more after the teams left and moved the remaining dirt ahead of the shovel and then moved his shovel up, this time would not have been wasted as it was, and wagons could have been loaded from the start at the rate of about two a minute.

It would also have been possible the evening before to have blasted the boulder, which could be seen on the surface and which was partly drilled the night before. Of course, to dig around the boulder and expose it meant to save a few pounds of explosives, but the extra cost of powder was nothing as compared to the wasting of about $5 while the blast was made. During the first 35 minutes, 23 wagons were loaded, but if the work mentioned had been done the evening before certainly more than 40 wagons would have been loaded in the same time.

Notice that when the shovel moved ahead and had plenty of dirt, even if some of it was mixed with

Date May 18 Operations	No. Dips Made	Consumed Time Min.	Consumed Time Sec.	Average No. of Dips Per Min.	No. Vehicles Loaded	Average No. Vehicles Loaded Per Min.	Average Time Per Load Sec.	Average No. Trips Per Vehicle	Remarks
Shovel	7	2	10	3.4	3	1.4	43	3.33	Wasted a few seconds
Type O	20	8	45	2.3	10	1.1	53	2.	to adjust harness
Gasoline	12	5	30	2.2	5	0.9	66	2.4	Working around
Dipper Size	12	5		2.4	5	1.	60	2.4	boulder
½ Cu. Yd.	21	6	15	3.4	11	1.8	34	1.8	
	14	5	55	2.5	7	1.2	51	2.	
Wagons Used	22	6	10	3.5	11	1.8	34	2.	
1½ Cu. Yds	27	8	35	3.1	17	2.0	30	1.6	
Capacity	14	4		3.5	8	2.0	30	1.8	
No. 8	9	4	56	1.8	5	1.0	59	1.8	Cleaning up pit
Rated Speed									
of Dipper									Moving
4 Dips per			34						Sweeping in the dipper
min revolving		1	10						Moving Platform
90°		1	15						Moving Shovel Up
			30						Blocking Wheels
Bank 6 feet			55						Moving Sweeping in the dipper
deep. Some		3	10						Moving Platform, Chain
large boulders		2	15						Broke, Moving Shovel
			45						Platform Parted
									Blocking Wheels
Totals									

FORM NO. 1. USED FOR TIME STUDY

Date May 18 Time Record	Start Shovel	Stop Shovel	Explanation	Time Operating	Time Moving	Time Waiting Wagon	Time Blasting	Time Repairs	Time Other Delays	Remarks
				Minutes	Minutes	Minutes	Minutes	Minutes	Minutes	
	7:00	7:05	Oiling etc.	11					5	Waiting a few
Operation	7:05	7:16	Slight Stop. 55ec.		3½					seconds adjusting
Moving	7:16	7:19½		10½						harness.
Operation	7:19½	7:30	Working around Boulder							Also moving back
Blasting	7:30	7:35	Shorting Boulder							to blasting.
Moving	7:35	7:39	Extra Distance Due		4					Wagon gathered
Operation	7:39	7:45	Short Swing	6						near shovel due
Waiting	7:45	7:50	Waiting for Wagon			5				to blast and moving
Operation	7:50	7:56	Band Slipping	6						
Repairs	7:56	8:03	Ajusting Friction Band							
Operation	8:03	8:09		6						
Moving	8:09	8:13½			4½					
Operation	8:13½	8:22		8½						
Waiting	8:22	8:25	Waiting for Wagons			3				
Operation	8:25	8:29		4						
Waiting	8:29	8:31	Waiting for Wagons			2				
Operation	8:31	8:36		5						
Moving	8:36	8:43	Chain Broke		7					Moving Platform
Operation	8:43									
Total										

FORM NO. 2. USED FOR RECORDING WORK DONE

pieces of broken stone, how rapidly the shovel was operated making more than three dips per minute and loading two wagons per minute. Then, too, note how when the friction band slipped the work was cut down from 1.8 wagons per minute to 1.2 wagons and as soon as this band was adjusted the higher rate of loads was obtained at once. This shows conclusively that as soon as anything is wrong it should be fixed, for machinery out of order gives poor results.

The rest of the record shown in Form No. 2 illustrates that the service to this shovel was poor, as in an hour's time 10 minutes were lost in waiting for wagons. If time had not been lost for other reasons from 7 to 7:45 there would have been lost time due to waiting for wagons. This shovel for the work it was doing should have been served with four more wagons.

Attention should be called to the two records given of moving the shovel. The first one was done rapidly, namely in 3½ minutes, while the second one consumed 7 minutes. This was due to the chain breaking in moving the first section of the platform. This meant that time was consumed in changing the chains from one section of the platform to another, which could have been prevented by having an extra chain with the shovel. With two chains the shovel was moved rapidly, with one chain much slower. The platform parting was another mishap due to the lack of an extra chain.

The records here shown give the result of loading 81 wagons in an hour and 43 minutes, or an average of 47 in an hour. With a load of 9/10 of a cubic yard this means about 425 cubic yard excavated in a 10-hour day. This can be called a good day's work for a shovel of this kind, yet the record shows that during the 103 minutes, the shovel actually worked but 57 minutes, 19 minutes being consumed in moving, 10 minutes waiting for wagons, 5 minutes for blasting, 7 minutes for repairs and 5 minutes for oiling. If the contractor had given better service to the shovel 27 minutes could have been saved and possibly 30 minutes. This would have meant that at the same rate of operation at least 40 more wagons would have been loaded, making a rate of excavation of about 600 cubic yards in a 10-hour day, a handsome profit on a day's work, offset only by the cost of four more wagons.

In keeping these records the recording clerk can keep the number of dipper loads with the hand-counting machine. He uses a stop watch for the time. He keeps the record of the wagons loaded by tallying on a piece of paper. The other four columns are filled out by calculations.

By Column 4 the speed of the shovel is shown and the size of the load in the dipper is obtained from Column 8. The service of the shovel by the wagon is shown in Columns 6 and 7. It is by these four columns that quick comparisons are made and the work of both the shovel and the wagons can be analyzed. The greater the number of records the more easily it can be done.

In keeping the record on Form No. 2 the important items is the time of starting and stopping kept by an ordinary watch and the stop watch, the explanations under "time record," "explanation" and "remarks." The rest can be filled in after the field work is done, and from the time columns an analysis can be made that will allow much lost time to be eliminated. Any intelligent clerk can be taught to make such records. The results, though, should be worked up by an experienced man, although it is evident that many of the faults of the service to a machine can be seen from such records by any contractor or his superintendent.

In the case of this gasoline shovel, it would seem that the operator of the shovel was capable of handling the machinery, but rather indifferent as to the details of the pit work. The shovel foreman over him seemed just as indifferent to the same details, being willing to do as others might have done. It has been shown how time could have been saved by them. The contractor, though, was the man who was at fault, for he was not seeing that the proper service was rendered to the shovel.

Thus when he bawled out his order to speed up this shovel it was up to him to furnish the service that meant greater speed and more work at a lower unit cost.

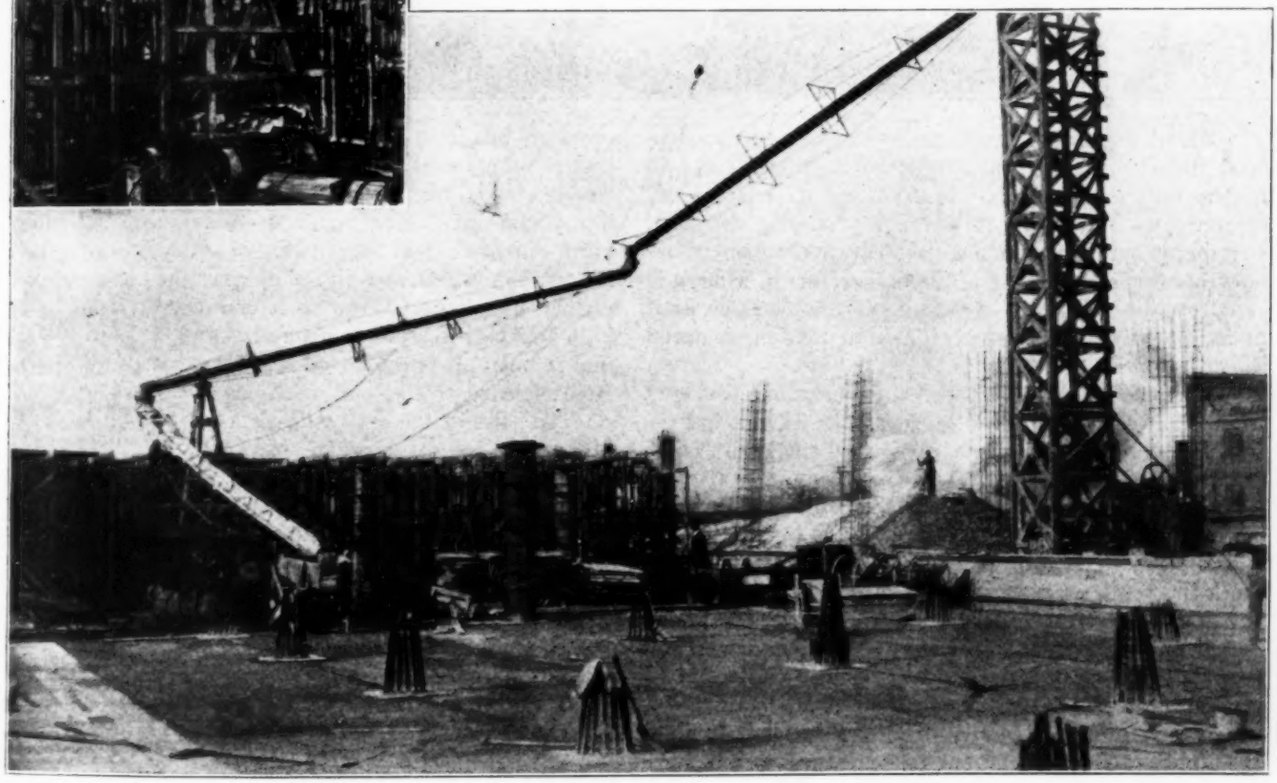
MOVING LONG CHUTE WITH THREE MEN

Tripod Mounted on Mixer Wheels Solved Problem for Atlanta Contractors

WHEN the Southern Ferro Concrete Company installed a chuting equipment consisting of three 50-ft. sections for building the new factory of the Southern Spring Bed Company in Atlanta, Georgia, the problem of supporting the chute soon presented itself. No counter-weight had been provided like those in use on many chuting equipments and at first a gin pole was used to support the second section of the chute. After trying out this plan it soon became evident that it would not work well. Whenever the chute had to be moved it took about 16 men to do the job.

Finally W. D. Hayes and E. K. Doster, superintendent and assistant superintendent, decided that they would find some other way to support the chute. The photographs show the solution of the problem. They built a wooden tripod which was fastened to the second section of the chute a few feet from its lower end, and in order to make the tripod movable it was mounted on the wheels of a mixer. During the time when the concrete mixer is busy on a job such as that described, the wheels are superfluous; in fact, they are frequently taken off anyway so that the mixer will stand more firmly. By utilizing these wheels to support the tripod they were made to work at a time when ordinarily they would be idle. As it took only three men to move the tripod from one place to the other and considerably less time than had formerly been consumed, the tripod more than justified its construction.

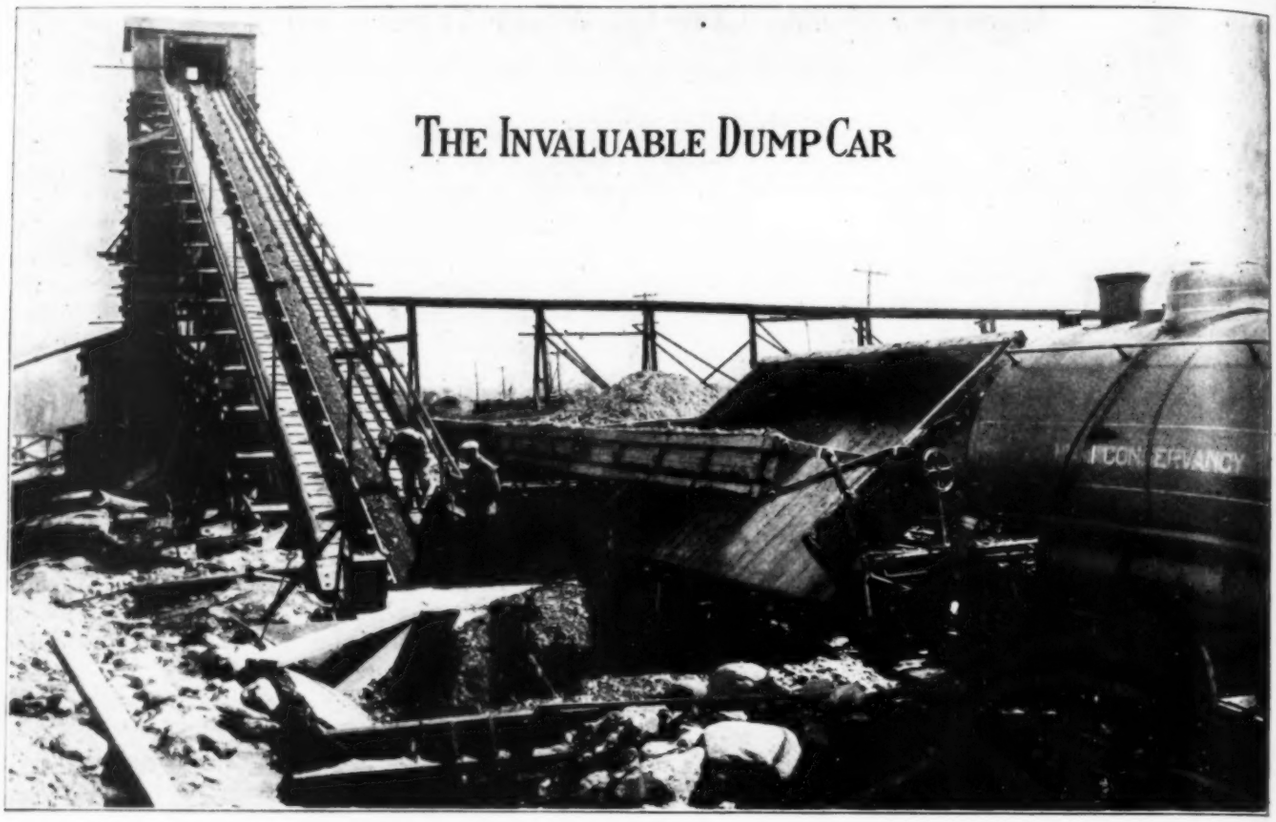
The building on which the tripod is being used is about 462 ft. by 100 ft. and when finished will be four stories high. The photographs show two views of the tripod at a time when the concrete for some of the columns was being poured.



ANOTHER MOTOR CONVOY TO COAST

The War Department is planning to send a motor convoy from Washington, D. C., to Los Angeles over the Bankhead National Highway. It probably will start about June 15 and arrive in Los Angeles early in September. The motor transport corps will have charge of the convoy, which will consist of a complete motor transport unit at war strength, one service park unit at war strength, a detachment from the engineering corps and a detachment from the medical corps. All of the motor trucks on the convoy will be of 1½-ton type and will be equipped with pneumatic tires. The route will begin at Washington and the convoy will pass through the following states: Virginia, North and South Carolina, Georgia, Alabama, Mississippi, Tennessee, Arkansas, Texas, New Mexico, Arizona and California. It undoubtedly will create interest in better roads.

THE INVALUABLE DUMP CAR



ONE of the most interesting developments in modern industry has been the invasion of the industrial field by the modern side-dump car, showing its adaptability for purposes for which it was not primarily designed. Originally built for hauling in excavation work, it has now been adopted by manufacturers for a wide and rapidly extending range of service. There seems no limit to its practical use when it comes to hauling material which is to be dumped.

Wherever the best type of side-dump car has been installed in industrial plants great labor saving has resulted and many economies have been effected. There is hardly a large industry which has not an individual haulage problem, sometimes handled efficiently, but too often in a makeshift way, involving losses in time, money and efficiency which, if realized, would astound and shock the management. In these days of production need and high labor cost it seems an economic crime not to install machinery, or more efficient machinery, wherever possible. Industrial managers generally will find it profitable to focus attention on their plant hauling system, which often handicaps an otherwise modern plant and limits production. State your hauling conditions to the dump-car manufacturer and the chances are that his engineering department will be able to suggest an installation, which not only will increase production but will pay for itself by money saved.

A case of this kind may be cited briefly. The superintendent of a steel industry in Cleveland, Ohio, devised a new method for handling furnace slag in side-dump cars and figured to his own satisfaction that he would be able to pay for a dozen large cars in a year's time out of money actually saved, without increasing the capital account at all.

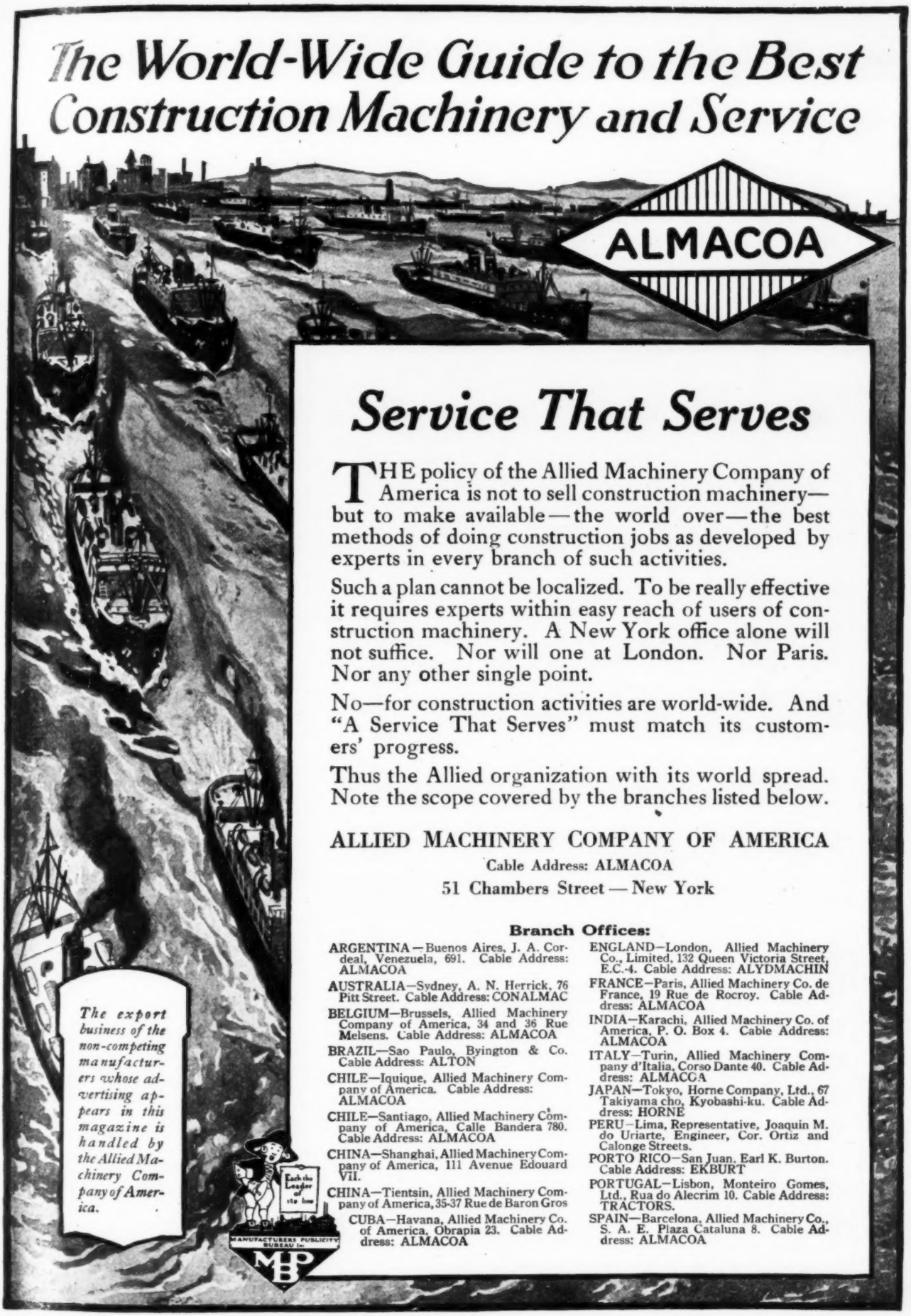
A partial list of the materials which industrial concerns are handling profitably in side-dump cars may suggest to others similar uses and lead them to adopt scientific methods for wasteful and makeshift methods of transportation: ashes, cinders and waste generally, burnt-out sand from foundries, low grade ores of various metals, the overburden in stripping mines and quarries, rock in quarries, clay for brick making, wood blocks for pulp making, gypsum, sand and gravel, coal in storing, coal in open-pit mining, coal for supplying furnace rooms from elevated tracks, etc.

The size of the car required depends upon local conditions and the nature of the work required. The largest dump cars in use were especially made for hauling wood blocks in Anticosti. They are of 44 cu. yd. capacity. The largest standard dump cars at present are of 30 cu. yd. capacity. Just what the limit of practicability may be it is not safe to conjecture. At the beginning 1¼-yd. cars were thought the last word in dump car construction; now it is the 30-yd. automatic compression lock air dump car. Tomorrow the never-satisfied manufacturer, in co-operation with some ambitious customer, may improve even that.

The size has continued to increase so far as rapidly as new problems of haulage have arrived requiring it. For example, the first large dump cars were used on the Panama Canal. The United States Government put its needs squarely up to the leading manufacturer of dump cars in the country and the result was the now popular 12-yd. air dump car. Without it the Government might still be digging away at the canal.

No industrial or construction manager these days can afford to put up with an unscientific and inadequate plant transportation system, whether for hauling waste or material. The best thing to do is to put your problem up to the manufacturer and let him wrestle with it.

The World-Wide Guide to the Best Construction Machinery and Service



Service That Serves

THE policy of the Allied Machinery Company of America is not to sell construction machinery—but to make available—the world over—the best methods of doing construction jobs as developed by experts in every branch of such activities.

Such a plan cannot be localized. To be really effective it requires experts within easy reach of users of construction machinery. A New York office alone will not suffice. Nor will one at London. Nor Paris. Nor any other single point.

No—for construction activities are world-wide. And "A Service That Serves" must match its customers' progress.

Thus the Allied organization with its world spread. Note the scope covered by the branches listed below.

ALLIED MACHINERY COMPANY OF AMERICA

Cable Address: ALMACOA

51 Chambers Street — New York

Branch Offices:

ARGENTINA—Buenos Aires, J. A. Cordeal, Venezuela, 691. Cable Address: ALMACOA

AUSTRALIA—Sydney, A. N. Herrick, 76 Pitt Street. Cable Address: CONALMAC

BELGIUM—Brussels, Allied Machinery Company of America, 34 and 36 Rue Melsens. Cable Address: ALMACOA

BRAZIL—Sao Paulo, Byington & Co. Cable Address: ALTON

CHILE—Iquique, Allied Machinery Company of America. Cable Address: ALMACOA

CHILE—Santiago, Allied Machinery Company of America, Calle Bandera 780. Cable Address: ALMACOA

CHINA—Shanghai, Allied Machinery Company of America, 111 Avenue Edouard VII.

CHINA—Tientsin, Allied Machinery Company of America, 35-37 Rue de Baron Gros

CUBA—Havana, Allied Machinery Co. of America, Obrapia 23. Cable Address: ALMACOA

ENGLAND—London, Allied Machinery Co., Limited, 132 Queen Victoria Street, E.C.4. Cable Address: ALYDMACHIN

FRANCE—Paris, Allied Machinery Co. de France, 19 Rue de Rocroy. Cable Address: ALMACOA

INDIA—Karachi, Allied Machinery Co. of America, P. O. Box 4. Cable Address: ALMACOA

ITALY—Turin, Allied Machinery Company d'Italia, Corso Dante 40. Cable Address: ALMACCA

JAPAN—Tokyo, Horne Company, Ltd., 67 Takiyama cho, Kyobashi-ku. Cable Address: HORNE

PERU—Lima, Representative, Joaquin M. do Uriarte, Engineer, Cor. Ortiz and Calonge Streets.

PORTO RICO—San Juan, Earl K. Burton. Cable Address: EKBURT

PORTUGAL—Lisbon, Monteiro Gomes, Ltd., Rua do Alecrim 10. Cable Address: TRACTORS.

SPAIN—Barcelona, Allied Machinery Co., S. A. E. Plaza Cataluna 8. Cable Address: ALMACOA

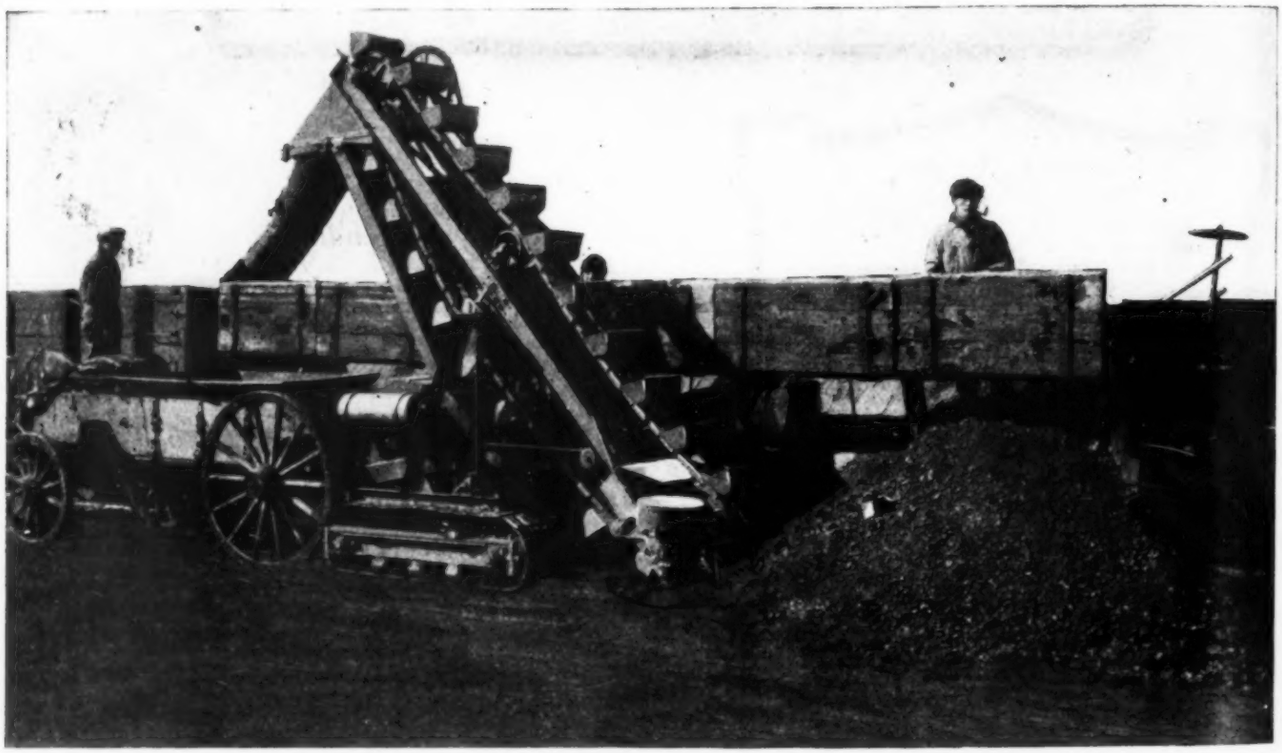
B STANDARDIZED MATERIAL-HANDLING MACHINES G

B-G Loader Performance

Performance—that's what you really want and expect from any machine you buy. You do not care so much what the machine is, so long as it does its work—and does it well.

But to give *maximum* **performance,** a machine must be soundly built along the best known design. It is on this **performance** basis that the B-G Loader has made its enviable reputation.

No other machine can turn out the work—over 75 cubic yards per hour—that the B-G easily handles. Under every condition and on all kinds of loading jobs, the B-G Loader gives the absolute *maximum* in **performance.**



Model 20 B-G Self-Feeding Bucket Loader loading a wagon with cinders from drop bottom cars. Just one of the hundreds of uses for this machine.

Barber-Greene Company

AURORA, ILLINOIS, U. S. A.

BRANCH SERVICE AND SALES OFFICES:

New York	Hartford	Detroit	Milwaukee	Birmingham	Salt Lake City
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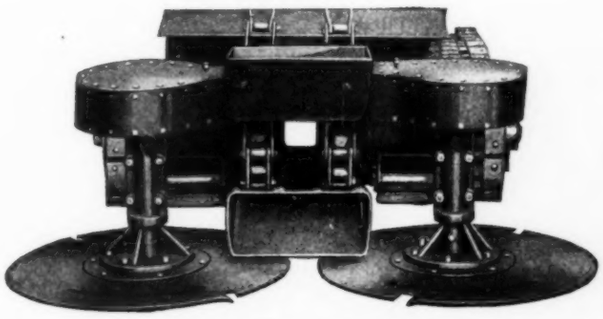
B STANDARDIZED MATERIAL-HANDLING MACHINES G

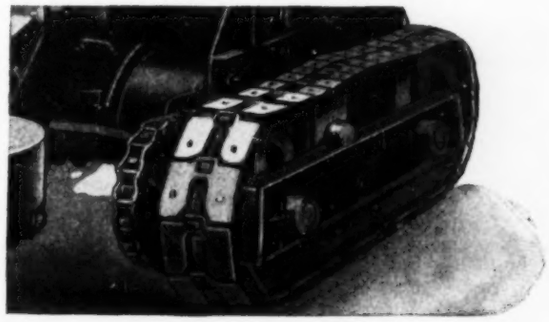
Due to these Features

Model 20 is not a new and untried experiment—it is simply an improvement on the first self-feeding Bucket Loader ever built—a B-G machine.

Back of it are years of experience, and hundreds of older Loaders in daily operation all over the world. A quality machine in every meaning of the word.



Patented Rotary Disc Feeder



Crawler Type of Traction

THIS one feature alone puts the B-G in a class by itself. Two 36-in. flat steel discs rotate toward the center, carrying the material to the buckets, keeping them always filled, and furnishing a smooth surface from which to dig—driven by beveled gears fully enclosed. This feeder means large capacity, clean pick-up and absolute dependability.

ANOTHER new and advanced feature found only on the B-G Loader. Full length continuous treads 58-in. long by 8 in. wide, with specially designed track and link—self cleaning and thoroughly protected. This feature means that the B-G Loader can operate any place and under all conditions—no matter how deep the mud or how soft the footing.

And these are only two of the mechanical reasons why the new B-G Loader performs as can no other machine. There are other features just as important which you should know about.

Then there are also B-G Service-trained engineers within a few miles of your job who will work with you on your material handling problems. Write today for Catalog B.

Barber-Greene Company

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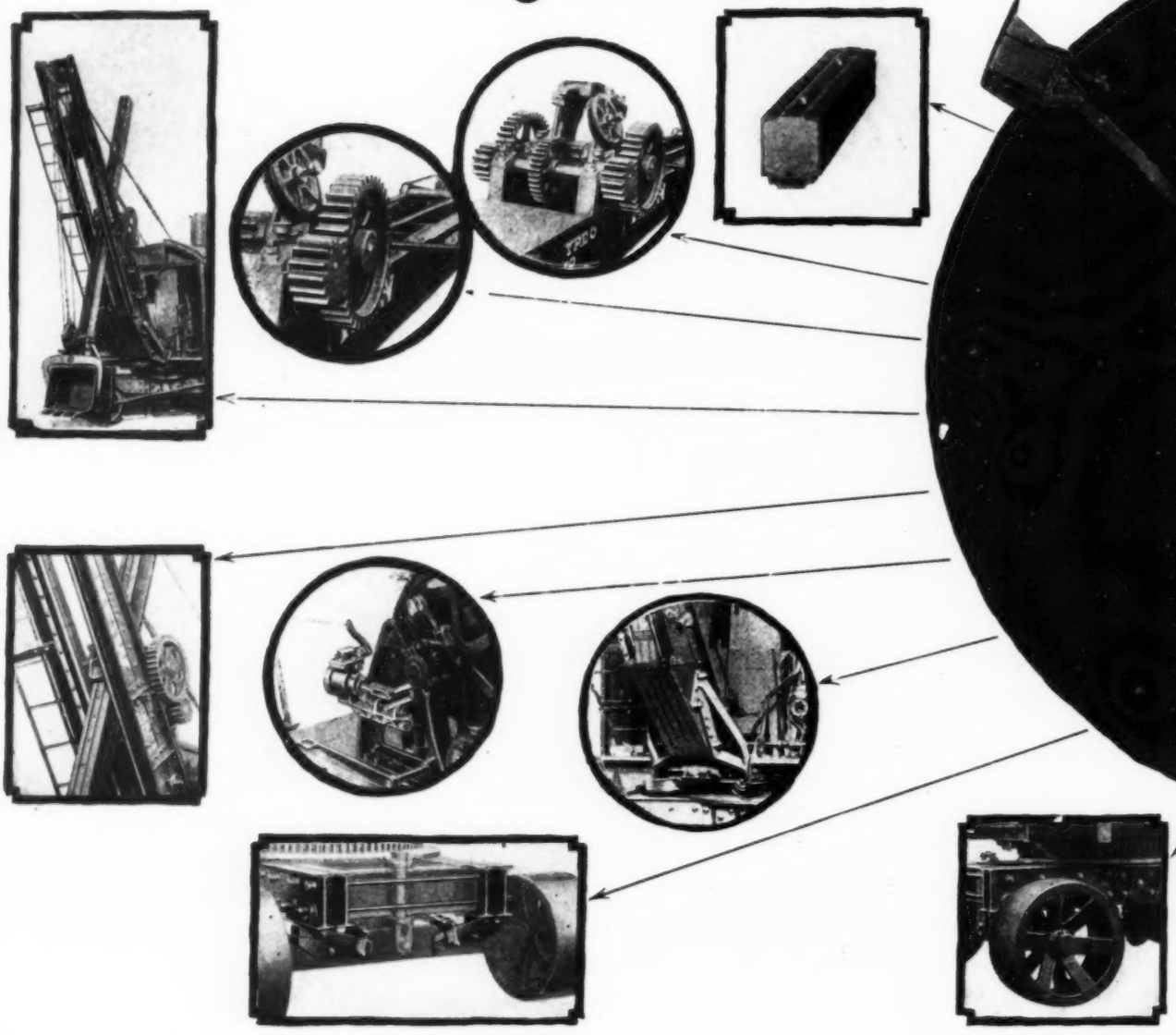
These Sixteen THEW Feature



1. THE PLATE GIRDER BOOM — Note that the side members are steel plate girders which give great strength — Oak separators at top and bottom give resiliency — easily tightened through bolts hold structure together. Scientific distribution of weight in this boom is a factor in the unusually low center of gravity and great stability which give this new Thew its remarkable ability to *dig, dig.*

2. BOOM HINGES — of heavy cast steel — wide base avoids side sway of boom — act as extra reinforcement to the boom structure.

3. DIPPER ARM GUIDES — These two heavy "T" rails inside boom hold the dipper stick firmly in alignment and eliminate the side sway. The guides mean not only added strength to boom and the relieving of strains on the shipper shaft but give much better control of dipper for long range work because they steady the stick.

4. SOLID DIPPER STICK — Only one member. This brings lightness without sacrifice of strength. No chance to get out of alignment. Only one rack which reduces friction losses.

5. ADDED THRUSTING POWER — Thew extra gear reduction in crowding mechanism gives maximum dumping height and dumping radius with dipper loaded. And remember Thew maximum dumping height and radius means something because the standard boom and dipper stick both are extra long.

6. TWIN GEARS ON SHIPPER SHAFT — Balance load on bearings and thus increase life of parts.

7. CUT STEEL GEARS — All the way through — Spur Gears and Bevel Gears — With two exceptions every gear in the new Thew has cut teeth — a most important feature.

8. THE THEW STEAM RAM — Double acting — released and engaged by steam power.

THEW Power Shovels

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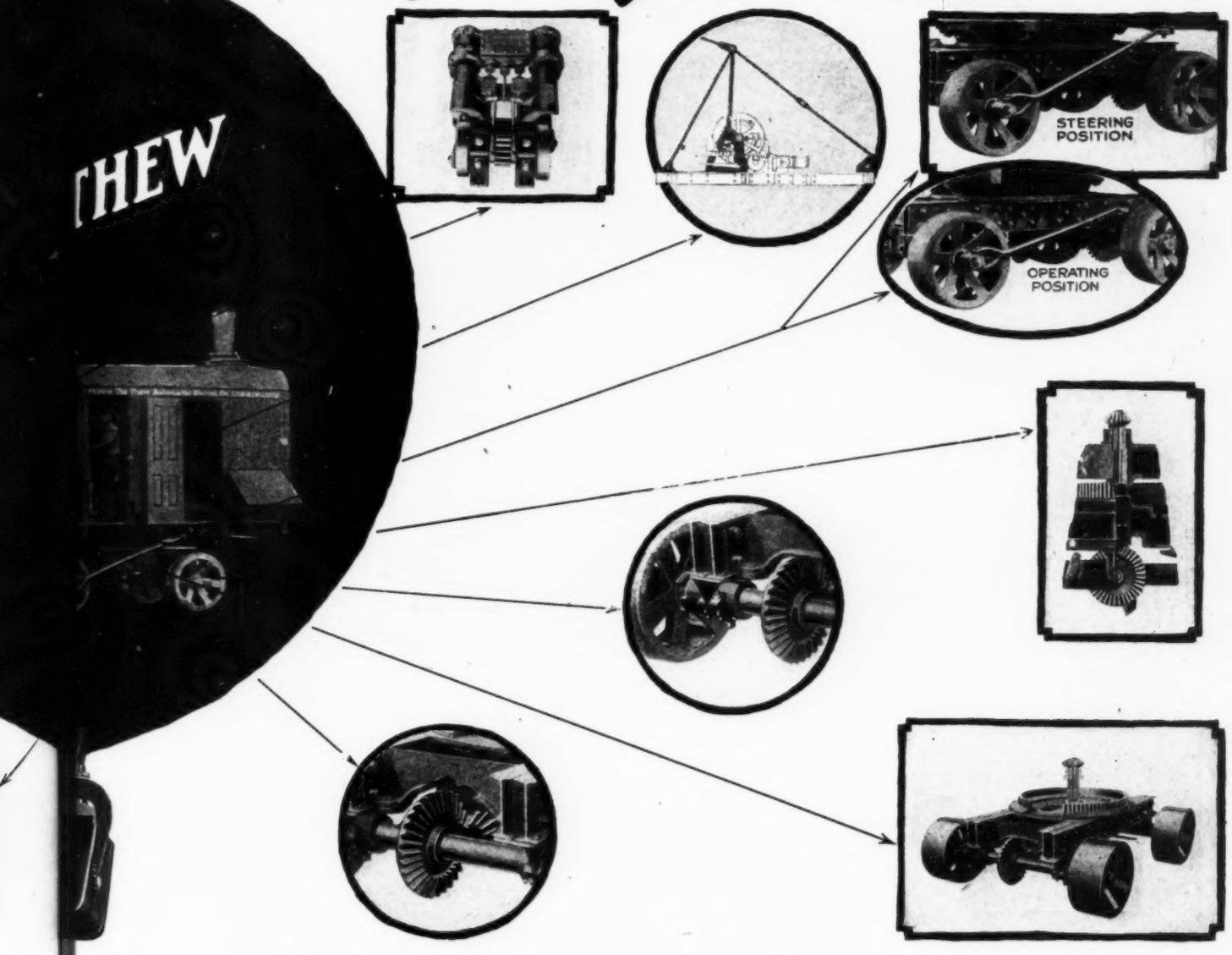
...nd What They Mean To You



Stationary situation on main hoist bearing. *No steam line through hoist shaft.*

9. ENGINE PINIONS BETWEEN BEARINGS —All Thew engine pinions are situated between bearings. This feature equalizes loads and strains and increases life of parts. All other Thew gears and pinions are so placed wherever possible.

10. THEW POWER STEER — Reduced to simplest terms and greatest efficiency and ease of operation. A single bar from turntable beam to end of swivel axle. Adjust from one position to the other by merely lifting a pin. Simplicity itself. Additional hand steering device a convenience in moving up while at work.

11. REINFORCED TRUCK FRAME—Combining best features of "all cast" and "structural" types—Cast center bed plate with double "I" beam reinforcements on each side. Here is strength with resilience. Longer wheelbase—additional weight—greater stability. Top surface machined with shoulder as is bottom of gear ring which means accurate centering — the gear ring held absolutely in position.

12. THEW CENTER PIN—Extra long, passing completely through turntable bed plate and relieving center shafts of bending strains.

13. SWIVEL AXLE SUPPORTS — Patented Thew design — Instantaneously engaged and released. Gives 4-point support to truck frame while in operation.

14. WHEELS THAT CAN'T DAMAGE PAVEMENTS—Round edged wheels are standard on the new Type O Thew. Heavily reinforced. Flanged edge for protection against breakage.

15. JAW CLUTCHES ON AXLE—Release one or both wheels from driving mechanism as desired. A distinct advantage for sharp turns or for hauling long distances.

16. THREE LEG "A" FRAME — Here is a strong point in Thew construction. This "A" frame forms a truss for the turntable beams reinforcing the entire structure.

...t of ...this Ne...hew — ...eam sh...icu-lar...Just ser...day.

The ...ovel Co... Ohio
CHI... Block
NEW... Street

THEW Power Shovels

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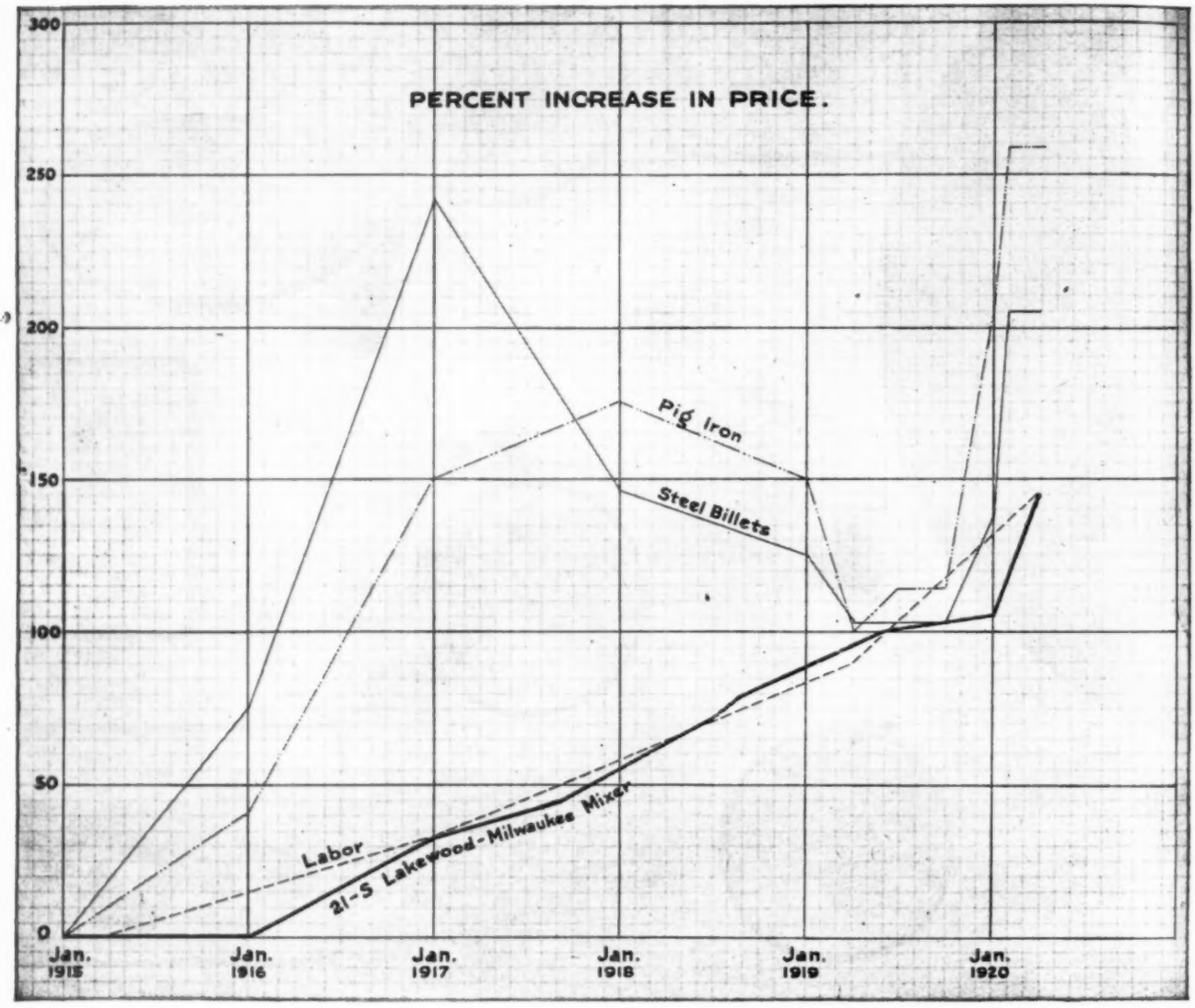

A Protection to the Buyer

THIS chart shows the percentage increases in cost of iron, steel and labor since 1915. Also the increases in cost of a No. 21-S Lakewood-Milwaukee Mixer mounted on trucks with steam engine and boiler. Note how much lower are your increases than those we have had to face. Only by careful and efficient manufacturing in quantity production has Lakewood been able to protect the buyer from even greater increases than those indicated.

LAKEWOOD BUILT TO LAST

Fixed Prices for Quarterly Periods

One price list which cannot be changed without notice

THERE is "One Price to All" for Lakewood equipment. Special concessions, discounts, rebates, etc., are given no one on Lakewood equipment. And Lakewood prices never are revised more than four times a year.

The buyer of Lakewood equipment has definite assurance that within the time specified on the price list, the cost of Lakewood equipment will not vary. He can thus figure his plant investment for a given job, even though he does not wish to purchase the entire outfit at once.

This "one price" and "period price" policy has been rigidly adhered to, even when rapidly rising costs would have fully justified an immediate revision of prices.

Lakewood keeps faith with, and protects its customers. A copy of the Lakewood price list is yours for the asking.

To serve you—Twenty-three Direct Sales Offices

New York City, Boston, Philadelphia, Richmond, Atlanta, Pittsburgh, Cleveland, Buffalo, Detroit, Milwaukee, Minneapolis, Chicago, Indianapolis, Kansas City, Houston, Dallas, Memphis, San Francisco, Portland, Seattle, St. Louis, Des Moines and Los Angeles.

THE LAKEWOOD ENGINEERING COMPANY, CLEVELAND, U.S.A.

LAKEWOOD BUILT TO LAST

Makers of Lakewood Construction Plant

Lakewood Road Construction Plant

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What is the Car Shortage Costing You?

Release Cars to Speed Your Job!!!

WHEN it is possible to unload gondola cars in twenty minutes with a Lakewood Clamshell, why use rolling stock as storage bins?

Load or unload quickly—help reduce the car shortage.

One user loaded a 50-ton gondola with coal in 13 minutes with a 1-yard Lakewood Clamshell Bucket. Another user unloaded three cars of gravel per hour, day after day, with a 3-4 yard Lakewood Clamshell Bucket.

Another user writes that in handling fireclay running from 10 to 15 inches in diameter, this Lakewood Clamshell would have handled 1-3 more than his plant was able to accommodate.

These are typical of the hundreds of cases where this kind of speed is made possible by the quick opening and closing feature of the Lakewood Bucket.

An Hour Saved per Car per Day = 102,000 Additional Cars.